

Rock Products

with which is incorporated

CEMENT *and* ENGINEERING
NEWS

AUGUST
1934

Founded 1896

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

PRICES, PROFITS and PROSPERITY

PUBLICITY, largely originating in Washington, D. C., but supported by many newspapers, trade journals and even the leading engineering journal of the country, takes the position that the prices of building materials must be reduced to stimulate construction.

THE PRESIDENT has started the campaign to force price-cutting by inviting bidders on government work to ignore their codes and cut not less than 5% and up to 15% from the open prices posted under their codes.

NRA is reopening the codes of the rock products building material industries and trying to *persuade* these industries to do away with the 5- to 10-day advance notice of effective date in posting prices—to make new posted prices immediately effective; thus insuring a return to price cutting and price wars.

IRRESPECTIVE of the merits in specific cases, we do not believe that general price-cutting on building materials will stimulate capital investment in buildings or construction of any kind; we have held this opinion during past years when our contemporaries also held that view; we could quote from their editorial columns that capital investments in building are never made in a falling market on building materials; we still believe this.

STABILITY of prices of building materials is what encourages building; and after several years of anguish and travail, the rock products building material industries seem about to achieve some small degree of price stability.

HIGH AUTHORITY seems to have overlooked the fact that profits are necessary to prosperity under a capitalistic system of economy; and that applies to the government as a purchaser; the theory that the government should buy at cost or below cost to save the taxpayers' money is wrong when the taxpayers' money purposely is being spent to *prime* the business recovery pump.

THE only object in all this government spending, or extravagance, if such you want to term it, is to put money into circulation and cause a return of confidence in business; there can be no return of confidence or prosperity until business is earning profits and investing them directly or indirectly in capital goods.

PRODUCERS of rock products! If your prices are fair and are based on cost plus a fair profit, we *urge* you to have sufficient strength of character to stand by them, the President's invitation to cut notwithstanding; it may be *lese majesty* or some other high crime or misdemeanor for us to write so; but we do because we believe that a return of prosperity is what we are aiming for, and we do not believe a return to price-cutting and business demoralization is the way to accomplish that objective.

IT is better for the government to take your profits away again by taxation, than to deprive you of ever having a chance to make them; for what you need, and every one needs, is a return of confidence in ourselves, and nothing inspires confidence like knowledge of the ability to earn profits.

— The Editor

CIRCULATED TO MORE PLANTS THAN
ANY OTHER PAPER IN THIS INDUSTRY

Consider

Capacity

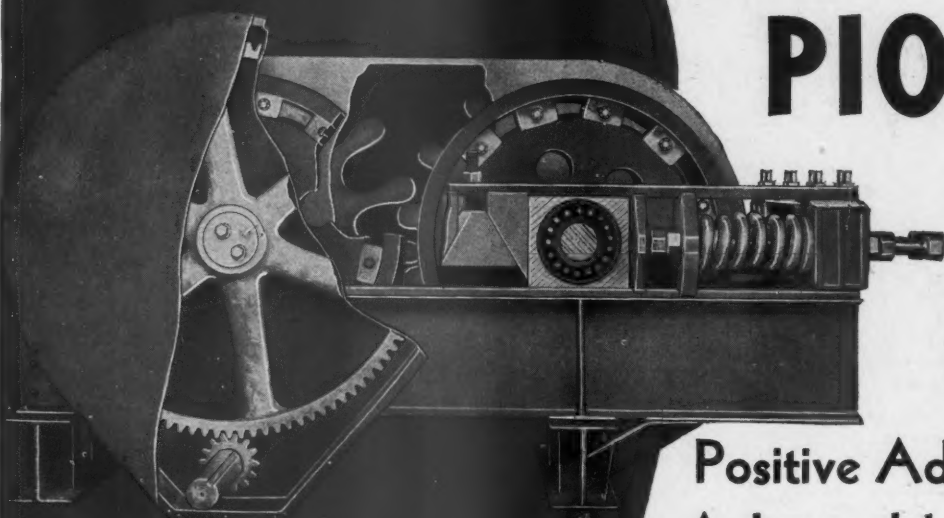
1½ TONS PER MINUTE

WITH

PIONEER

40x20

ROLLS



**3 Inch Minus to
1 Inch Minus
without Excess
Fines**

**Positive Adjustment for Size
Adjustable 3" to Dust
Both Rolls Power Driven
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Shafer and Timken Bearings

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Rolls Made in Four Sizes

Pioneer Rolls Do Your Job Faster, Cheaper, Better

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GMC
VALUE

**A NEW
5-TON TRUCK**

■ It's here! A brand new General Motors Truck. A big, husky 5-ton truck—priced at the lowest figure ever quoted on a GMC of this capacity. *In fact, priced \$1,000 under the average price of all other leading 5-ton trucks!*

Not only in price, but in design, construction and performance, this new GMC worker is just what thousands of owners will find exactly fitted for the job of hauling 5-ton loads more profitably.

Any GMC dealer will gladly tell you more about this latest addition to the modern, complete line of GMC quality trucks. Or an interesting descriptive booklet will be mailed upon request.

FEATURES

GMC valve-in-head engine—94 h.p.—230 ft. lbs. torque—stellite exhaust valve seats—downdraft carburetor—oil reservoir air cleaner—roller bearing fan with dual "V" belt drive—9" frame—booster brakes—448.7 sq. in. braking area—cast nickel iron brake drums—radius rod drive—standard S. A. E. loading space—full floating spiral bevel rear axle—needle bearing universal joints—spoksteel wheels.

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LESS THAN
THE AVERAGE
5-TON PRICE**

GENERAL MOTORS TRUCKS AND TRAILERS

GENERAL MOTORS TRUCK COMPANY

Time Payments Available Through Our Own Y. M. A. C.

PONTIAC, MICHIGAN

Rock Products

With which is
Incorporated **CEMENT and ENGINEERING NEWS** Founded
1896
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August, 1934

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WE CAN'T GET INSIDE TO DO OUR 'DIRTY WORK'



INTERNAL FRICTION
"This job is hopeless"



WATER
"Can't get a drop in"



HEAT
"Ugh, can't melt it"



INTERNAL CORROSION
"I'm licked"



COLD
"I give up"



MACWHYTE WIRE ROPE IS PROTECTED BY A SPECIAL KIND OF INTERNAL LUBRICATION"

• While the rope is being made, the spaces between the wires are packed full of lubricant. Hot or cold climatic temperatures, water or ordinary acids do not affect it. Macwhyte Wire Rope, including Monarch Whyte Strand, keeps its superior toughness and flexibility while on the job—because this special internal lubrication combats internal corrosion and fights internal friction.

Write for full details and interesting performance records.

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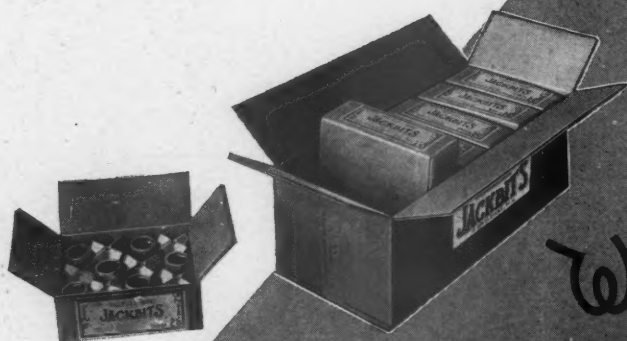
Use Monarch Whyte Strand PRE-FORMED for maximum service.

MACWHYTE
WIRE ROPE
internally lubricated

Both Macwhyte Preformed and Non-Preformed Ropes are internally lubricated

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11 Broadway, New York City





WIRE...THAT'S THE BACKBONE OF ANY WIRE SCREEN

*...and wire making has been
Roebbling's business for 90 Years!*

WHEN a Roebbling man talks about wire screen, he begins with "wire". For that is the very backbone of the product. Upon the use of the right wire depends the solution of most screen problems. In fact, it often determines screening costs.

Particularly when wire quality is an important factor, Roebbling is able to render exceptional assistance to screen users. For the making of high

quality wire and wire products is Roebbling's business...has been for over 90 years.

Roebbling's 54 years of experience in producing wire screen for widely diversified needs also works to the advantage of the Rock Products industries. It enables Roebbling to fully understand screening problems and service conditions, and to meet them.

Get our recommendations on Roebbling Wire Screen for your particular service. Take advantage of Roebbling's ability to produce screen to meet severe durability and efficiency requirements. We would be glad to receive your inquiry and request for samples.

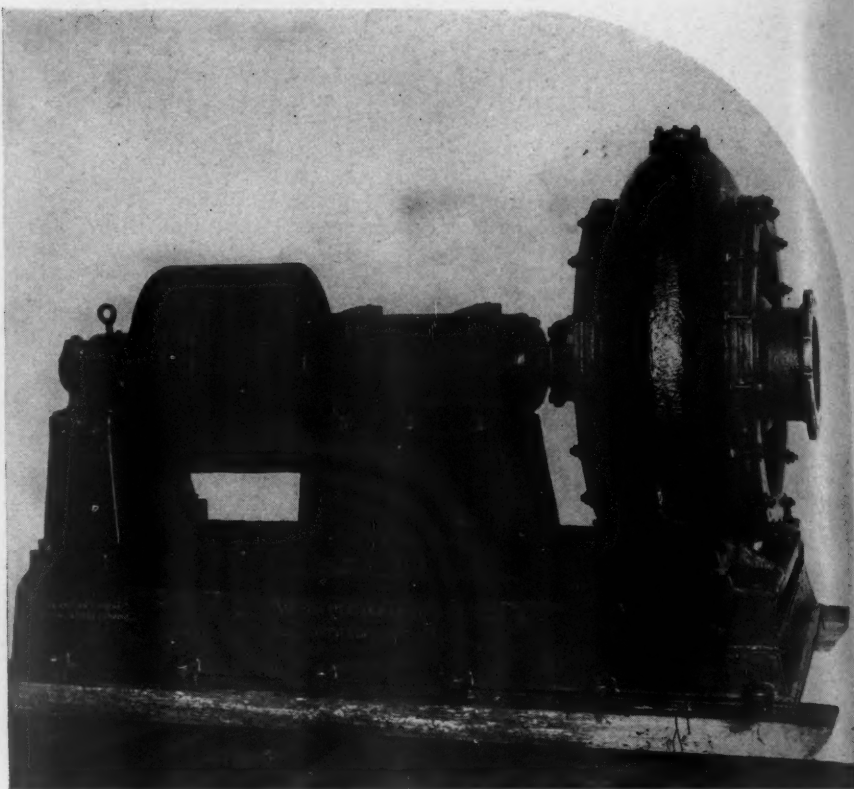
JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

ROEBLING *Wire Screen*



ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

**SKF EQUIPPED
BUILT BY
AMERICAN
MANGANESE
STEEL CO.**



No DOUBT ABOUT WORK WHEN PUMP HAS

SKF PERFORMANCE

THERE'S NO DOUBT about performance on the impeller shaft of this AMSCO Type "C" 8-inch dredge pump. It turns in SKF Bearings. And wherever there's an SKF, there's plenty of performance. Any engineer will tell you that.

And AMSCO engineers say that this pump can be furnished "with the anti-friction type of mounting, either ball bearings or roller bearings, or a combination of both . . . one set taking up the radial load at the pump and the other taking up the radial or thrust load at the pulley or coupling end of the bearing." Naturally, SKF's are preferred...for with SKF's there are no adjustments and only a little attention required. Which fills every need for dependability . . . durability . . . hard service . . . in a bearing.

● You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that costs little



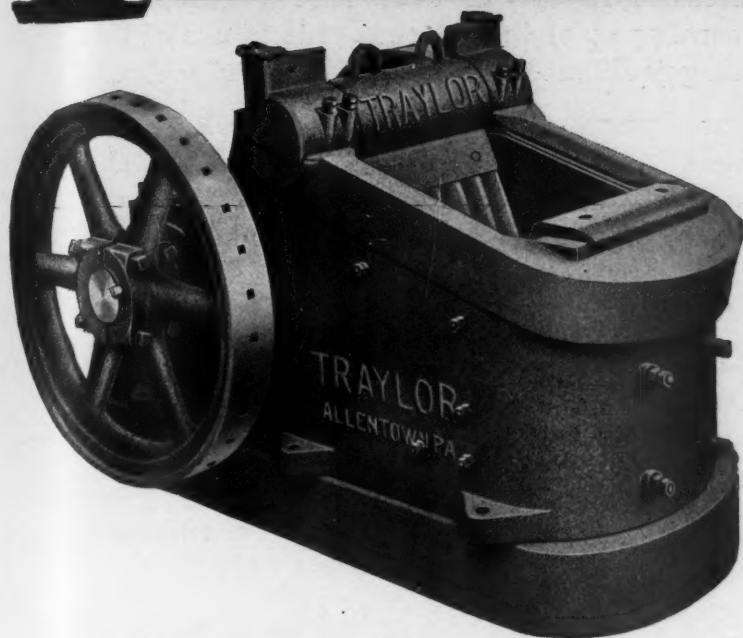
3255

SKF INDUSTRIES, INC., FRONT ST. and ERIE AVE., PHILADELPHIA, PA.

SKF

Ball and Roller Bearings

TRAYLOR



BULLDOG JAW CRUSHER STANDS THE STRAINS

STEEL BANDS are shrunk around the top and bottom of the rugged, semi-steel frame which absorbs shock and assures stability. The STEEL BANDS withstand the terrific operating strains that develop during crushing and protect the frame against breakage. This design is patented.

On the bottom end of the Pitman, and actuated by the Pitman Shaft, is an exclusive patented punching device that drives through a bar when any dangerous strain develops through packing or other obstructions in the discharge opening.

Crushing action stops INSTANTLY and the machine idles until stopped. To resume op-

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The Bulldog Jaw Crusher is also built with sectional cast frame, the sections of which will pass mine shafts for assembly and erection underground.

Ask for Bulletins 2099 and 3097.

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LOS ANGELES
919 Chester Williams Bldg.

SEATTLE
3410 First Ave. South

Manila Mach. & Supply Co.
Manila and Baguio, P. I.

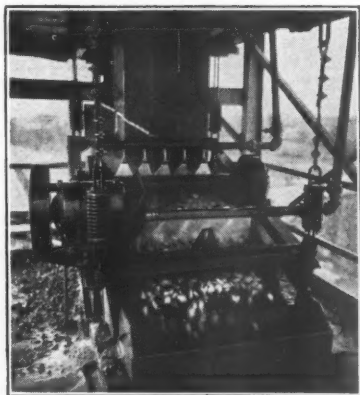
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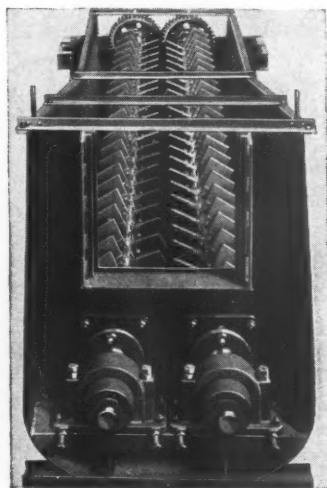
Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique.

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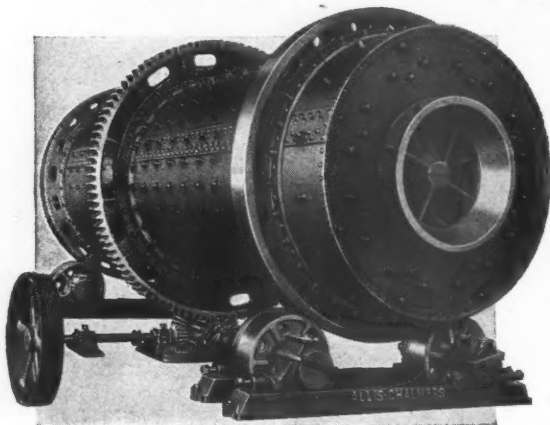
Complete Washing Equipment for Producing Clean Aggregate



*Vibrating Screen with Sprays
for Washing.*

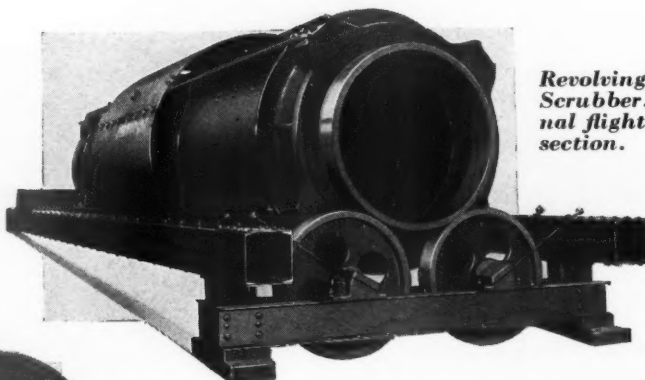
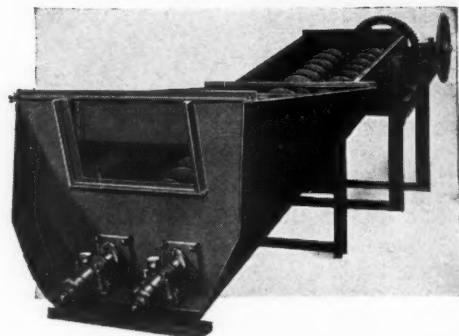


*Log Washer for Stone
or Gravel.*



*Left - Stone
Scrubber.*

*Right -
Double Screw
Sand Washer.*



*Revolving Screen Type
Scrubber. Note internal
flights in washing
section.*

THE demand for clean washed aggregates is increasing rapidly and concrete specifications are becoming so stringent that this phase of the producing problem has become vitally important.

Because some materials are easy to wash whereas others are difficult, depending upon the nature of the deposit, the selection of proper combinations of machinery to meet these varying conditions necessitates a complete line of washing equipment.

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— Allis-Chalmers Manufacturing Company, Milwaukee —

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3 CU. YD. EXCAVATOR

TYPE 4101

2½ CU. YD. EXCAVATOR



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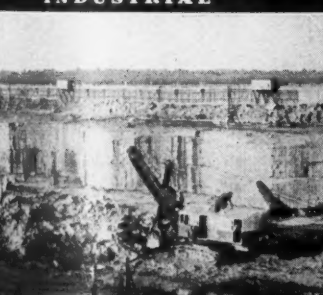
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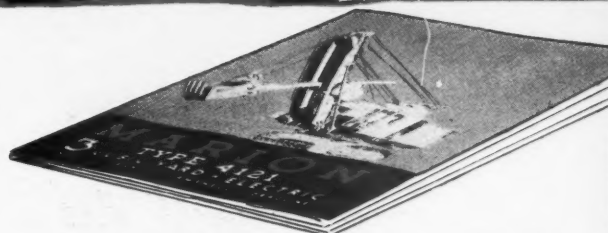


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STAMINA TO ENDURE THE SEVEREST KIND OF DIGGING

Enclosed, non-clogging crawlers—single reduction—herringbone gears for hoisting—inside dipper handle—boom length proportioned for ample digging effort—triple hatch to dipper for hoisting cable. These Marion features, proven on practically every kind of large material handling project, are responsible for the splendid acceptance accorded these two excavators. Compare the Marion Types 4121 and 4101 with other machines of the same capacity. Write for Bulletins.

THE MARION STEAM SHOVEL COMPANY, MARION, OHIO, U. S. A.



THE MARION STEAM SHOVEL CO., Marion, Ohio, U.S.A.
MARION, OHIO, U. S. A.

Gentlemen: Send me Bulletins on the Marion Types 4121 ☐ 4101 ☐

Name _____ Pos. _____

Firm _____

Address _____

City _____ State _____

"Another of the same" is often the Wrong Way to Buy Belts

The belt you are replacing may have *seemed* to give good service. But are you sure it was the *best and longest service possible*?

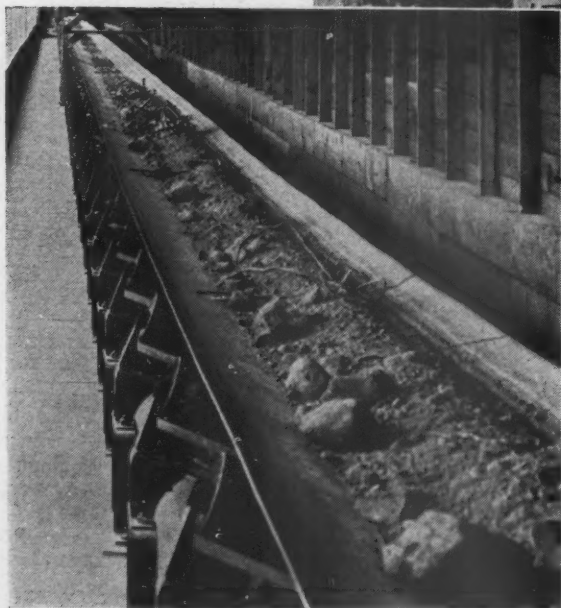
Rarely are any two conveyor belt installations exactly alike, and so stock specifications are not enough. Belt conveying equipment changes with use, and so older equipment may require a belt different from that originally installed.

As far as possible, every conveyor belt order is treated by Goodrich as a separate engineering problem. We would like to work with your

engineers and belt experts to develop individual specifications for your particular belt which take into consideration the nature, weight, and temperature of material to be handled, the speed and incline of travel, the condition of pulleys, idlers and trippers. We don't guarantee that this Goodrich method will increase belt life in every case, but that has been the result so often that it's almost a Goodrich tradition.

The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

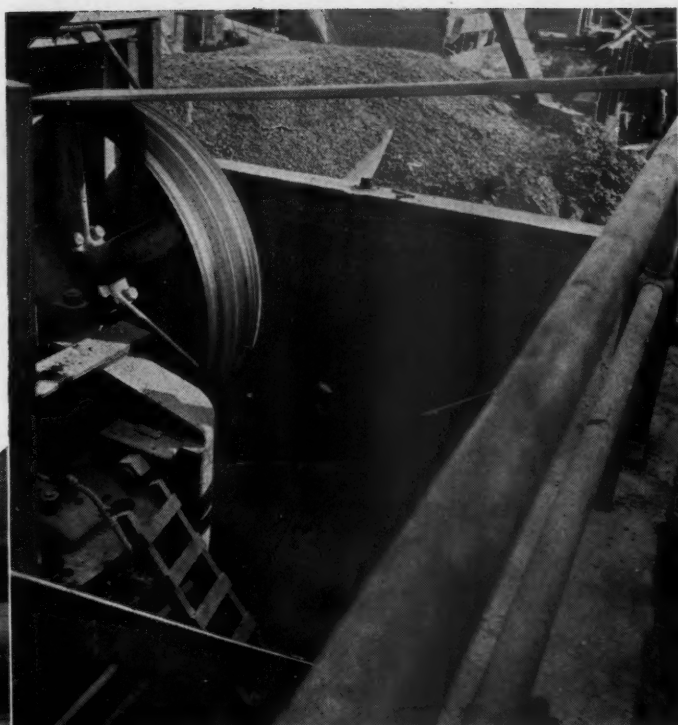
Covers toughened to withstand hard and sharp loads, edges that take the punishment of constant wear on idlers, construction so precise and well balanced that the belt runs true and straight . . . these are only a few of the many advantages you get in Goodrich Conveyor Belting.



Built to stand wear and weather alike, Goodrich Conveyor Belts have won for themselves the reputation of being the longest lived belts made.

Goodrich

No service in the rock products industry is too tough for Goodrich Highflex—the transmission belt which maintains tension . . . lasts longer and costs less in the long run.



Engineered to the job, Goodrich Conveyor Belts operate smoothly without continual "doctoring." They pay for themselves many times over in uninterrupted service.

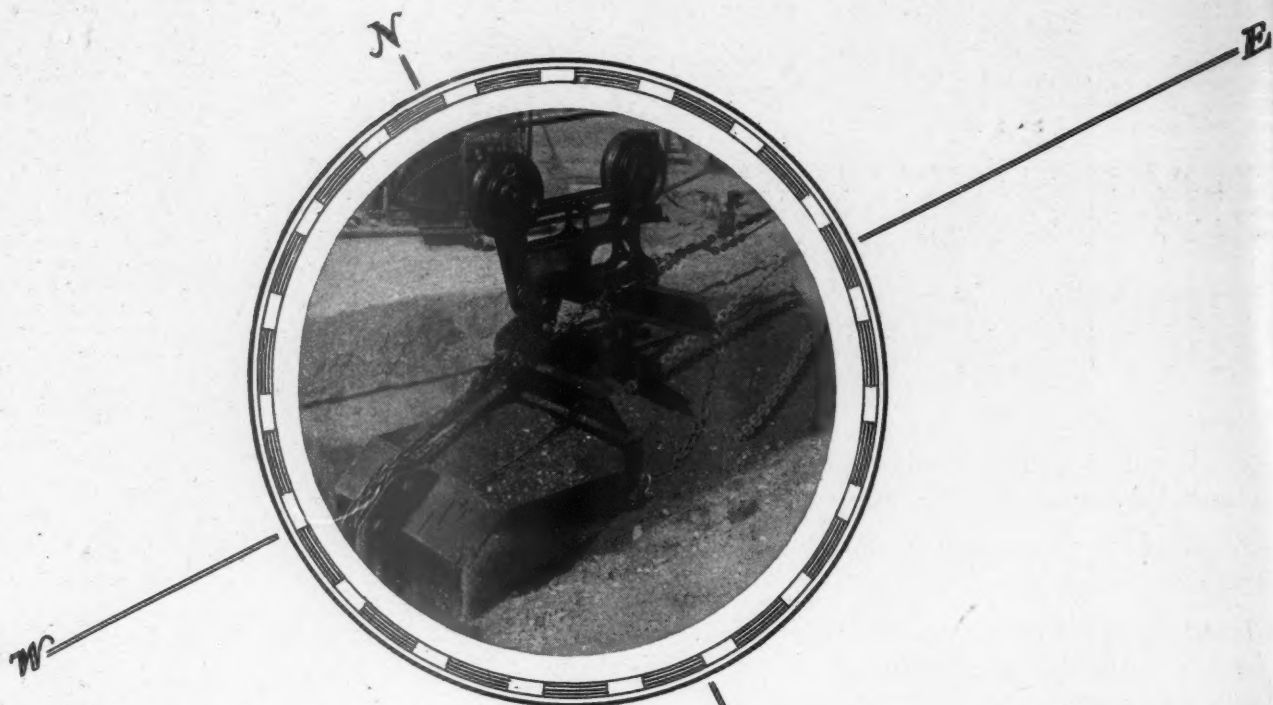
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- Multiple-V Belts
- Air, Water, Fire, Steam, Suction and Cement Discharge Hose
- Rubber Lining for Ball Mills
- Chute Lining
- Dredging Sleeves
- Packing . . . and
- A Complete Line of Miscellaneous Rubber Items



ALL *products* *problems* IN RUBBER

Conveyor Belting



Any time ~ any place ~ anywhere
WILLIAMSPORT *wire rope*
is Dependable

Williamsport "Purple Strand"—upholds and even advances Williamsport's standards of quality and endurance.

Unusual performance in ropes of small diameter is not so noticeable but in those of larger diameter—"Purple Strand" has proven its ability to take plenty of punishment on "tough" jobs, and stand up under it.

Williamsport is the *only* rope that insures you against getting the wrong grade of steel. Your protection also against substitution—The Telfax Tape—woven into the core of *every* rope—is a valuable protection and costs nothing.

Let us quote you on your next replacement—use Williamsport "Purple Strand"—convince yourself of its merit.

WILLIAMSPORT WIRE ROPE COMPANY

Main Office and Works: WILLIAMSPORT, PENNA.

Branch Sales Offices: 122 S. Michigan Ave., Chicago.

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ON ANY JOB DEPENDS ON THESE FACTORS..

1. *Design* . . . based on years of engineering experience and proved in service.
2. *Construction* . . . the use of only high-quality material and craftsmanship.
3. *Applicability* . . . skill in the job of selecting and installing equipment to meet squarely any handling problem you may have.
4. *Low Upkeep* . . . economy of operation and minimum repair cost.

Jeffrey Products . . . just a few are illustrated here . . . have a reputation for being well-made, for giving long service and for economical operation.

Jeffrey Engineers have had decades of experience in determining the right unit for your need. Let them assist you to economical, satisfactory, low-maintenance material handling.

Write for complete information.

THE JEFFREY MANUFACTURING CO.

935-99 North Fourth St., Columbus, Ohio

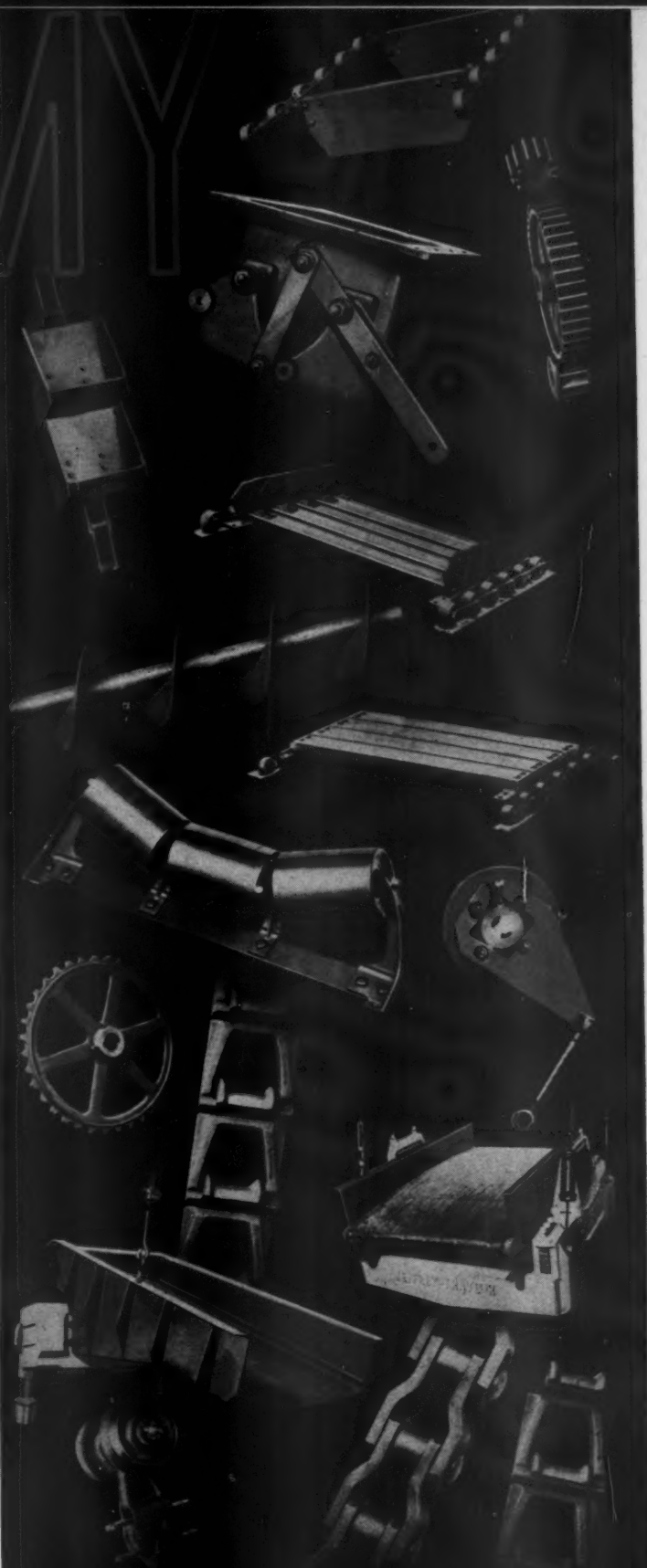
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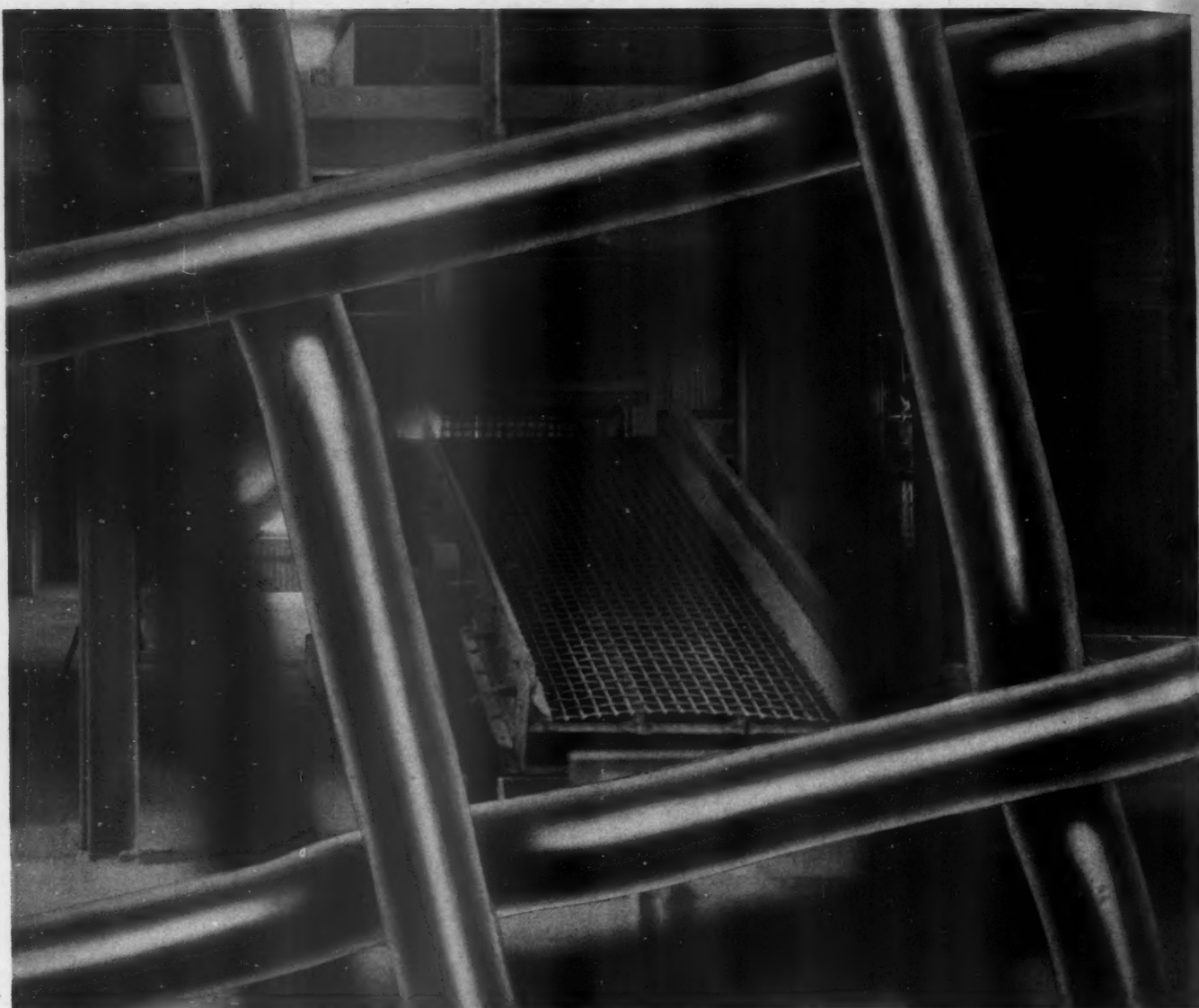
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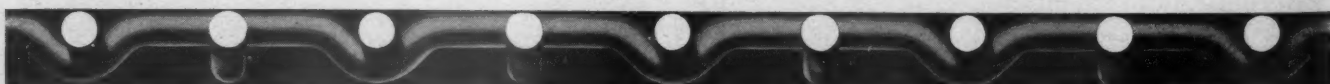


Accurate Screening Imprisoned for Life

ROL-MAN
A TRUE MANGANESE STEEL
**SCREEN
CLOTH**
- Welding Rods -
Forgings-Plate Products

Distortion of screen openings is impossible with the Patented ROL-MAN *Double Lock Mesh Weave* for every wire or rod is imprisoned for life by deep, short, down crimps at all intersections. This is a long sentence, for ROL-MAN *Processed Manganese Steel* has the amazing facility of adapting itself to your conditions, i.e., the impact and abrasion of screening service hardens its surface and as this crust slowly wears, the metal beneath becomes callous to resist further wear. Enlargement of openings from wear is thus imperceptible. Oversize material rapidly passes over the relatively flat screen surface produced by the down crimps, thus speeding the screening action and increasing capacity. Material approaching the size of the openings passes through with minimum wriggling, thus the tendency to wedge is reduced—ROL-MAN Screen Cloth is specially prepared for application direct to any make vibrator frame. Put in a ROL-MAN now and measure accurate screening life in months, instead of weeks. Complete information and prices sent on request.

MANGANESE STEEL FORGE CO.
Richmond St. and Castor Ave. Philadelphia



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The Ohio Power Shovel Company
Lima, Ohio

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Without obligation please send me copy of Bulletin checked.

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Address _____

State _____

Kind of Work _____

Position _____

TYPE 302 ☐ ¾ yard capacity.

TYPE 404 ☐ 1 yard capacity.

TYPE 502 ☐ 1 ¼ yard capacity.

TYPE 601 ☐ 1 ½ yard capacity.

TYPE 701 ☐ 1 ¾ yard capacity.

Remarks: _____



THESE bulletins illustrate and describe LIMA'S complete line of shovels, cranes, draglines and backdiggers, all of which are offered in sizes and types to exactly fit your requirements.

Shovel sizes range from ¾ cubic yard to 1 ¾ cubic yard capacities, inclusive, and in cranes the capacities range from 12 to 30 tons. All machines can be equipped for gasoline, Diesel or electric power.

Many advanced and exclusive features are incorporated in their design, features which assure faster and more economical operation.

The Coupon above, when filled out and mailed, will bring you a copy of any one or all of these bulletins.

The Ohio Power Shovel Company

DIVISION LIMA LOCOMOTIVE WORKS, INCORPORATED

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26-28 Fremont St.

SPOKANE
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Riverside Ave.

LOS ANGELES
4900 Santa Fe Avenue

PORTLAND, ORE.
338 First Ave., S. W.

DALLAS
1301 So. Lamar St.

SALT LAKE CITY
134-140 Pierpont Ave.

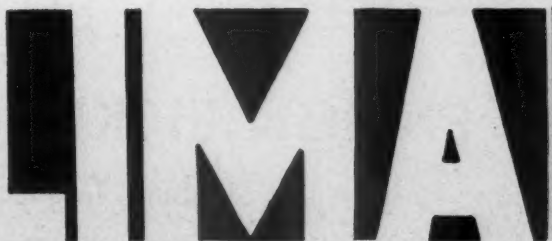
CHICAGO
1543 Straus
Building

NEW YORK
167th Street and
Sedgwick Avenue

NEWARK, N. J.
317 Frelinghuysen
Avenue

MEMPHIS
77 McCall Street

SHOVELS
CRANES
DRAGLINES
BACKDIGGERS



3-4 YARD
1 YARD
1 1-4 YARD
1 1-2 YARD
1 3-4 YARD
CAPACITIES



PROSPERITY DEMANDS *that* *the* BOSS *make money, too*

For good business, nothing will ever take the place of sharp pencils—backed up by clear thinking. And close figuring is very necessary these days.

Quarry men and contractors are finding it good business to use Cordeau-Bickford, the *insensitive* detonating agent. For in any but the most simple blasting, the savings effected by the use of Cordeau far offset its initial cost.

Among these savings are: less hazard in storing and handling; simplified loading with its savings in time; greater work from your explosives due to complete detonation of each charge; ease in the execution of complicated shots; better control of fragmentation; the use of fewer but larger shots with less interruptions; simplicity in hooking up and firing blasts.

Perhaps *you* can use Cordeau now. It's well to know about it anyway, because the time will come when this knowledge will put money in your pocket. The Cordeau book tells the full story: free to executives.



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5

POINTS

*that add up
to the*

TOUGHEST
AIR HOSE
and the most

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- 1 the *tube* . . . oil-resisting, non-porous, tough, resilient and slow-aging.
- 2 the *carcass* . . . triple and double braid construction, (depending upon pressure and size). Only the strongest cotton obtainable is used.
- 3 the *cover* . . . highest quality, extra thick, will resist maximum abrasion.
- 4 the *name* . . . "U. S. 4810" is the finest air hose the world's largest producer of hose knows how to build.
- 5 the *trademark* . . . "U. S." appears on more rubber products than any other trademark. This is your guarantee of superiority.

The United States Rubber Company recommends this hose as the most economical and most efficient air hose your money will buy.

Write today for prices and detailed information. Address the "U. S." branch nearest you or . . .

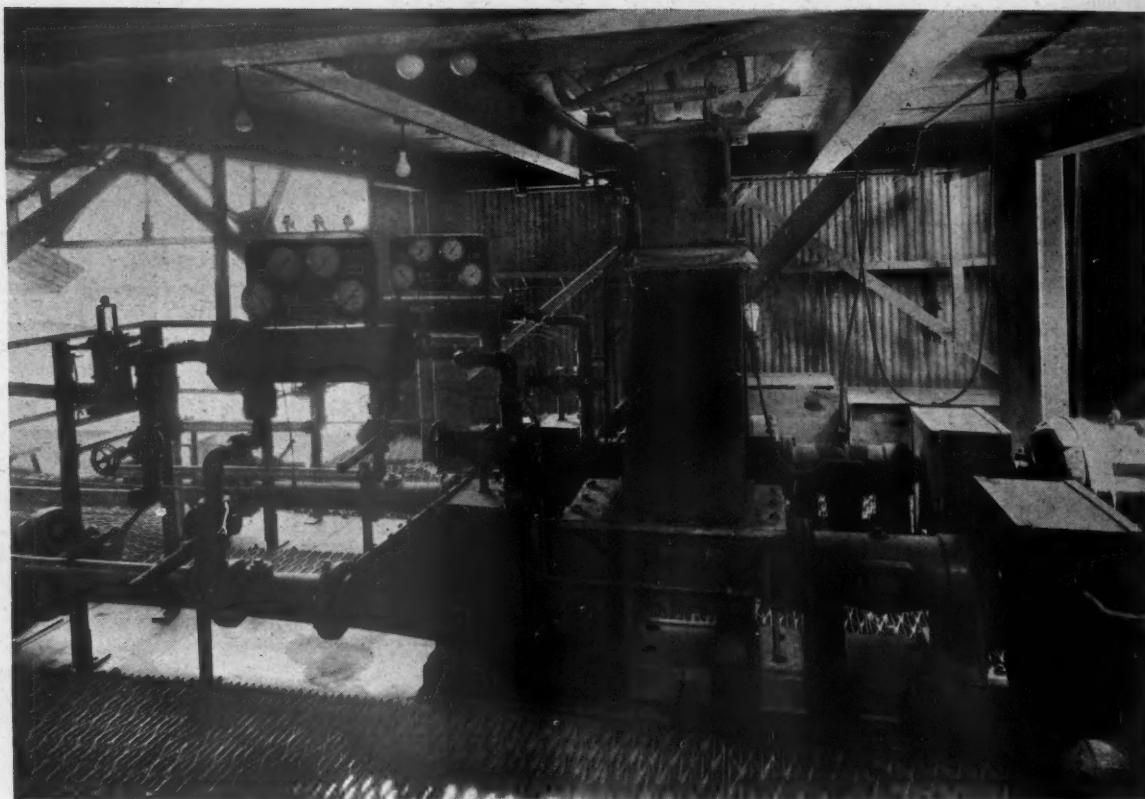


United States
1790 BROADWAY



Rubber Company
NEW YORK, N. Y.

THE NEW LOW PRESSURE — LOW VELOCITY PUMP



Two Type "H" Fuller-Kinyon Pumps (5") conveying dry cement raw materials through independent systems. The Fuller Rotary Feeder, part of which may be seen above the feed spout, is a part of our new weighing feeder.

THE FULLER-KINYON TYPE "H" PUMP

This new pump was specifically designed for stable operation at low pressures. Low pressure, low velocity pumping of dry pulverized materials radically reduces conveying costs. Substantial savings are made in power input to the motor, as well as compressor power. Maintenance costs have always been low, and further reductions have been made as the result of reduced friction and lower material velocities. Operation is stable and economical throughout the capacity range of the pump, providing for excellent operation, which well adapts the pump to wide variations in the rate of feed. This new pump has a number of me-

chanical advantages as compared with previous types that provide for greater convenience. The pump screw may be removed through a port in the valve body at the discharge end, without disturbing the bearings or their permanent alignment. The pump seal may be adjusted while the pump is in operation for the most economical power input corresponding to the rate of feed and the distance of conveying. Automatic lubrication insures a correct amount of oil circulation through the bearings regardless of the level of the oil in the reservoir, which is an integral part of the assembly.

Pulverized Material Feeders and Batchers

Airveyor, — pneumatic conveyors

Compressors and Vacuum Pumps

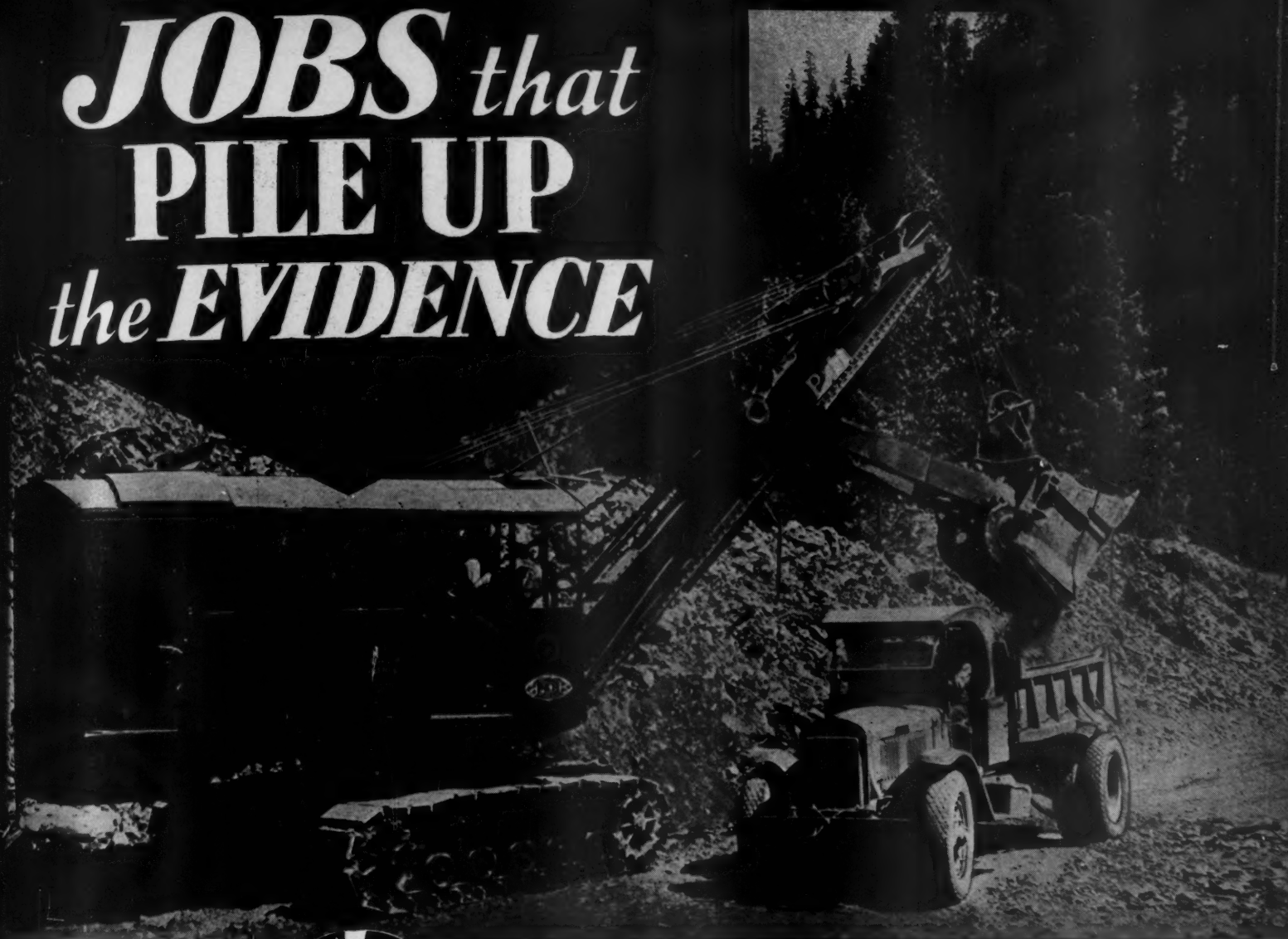
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JOBS that PILE UP the EVIDENCE



What **P&H** *split second* **CONTROL** means in boosting yardage

Somewhere near you there's a P&H machine on the job. See for yourself the difference in performance. That's the way to understand what these new improvements mean in boosting yardage and lowering costs. We'll be glad to show you one.

IT'S not only the faster digging cycle that makes P&H performance so outstanding. It's P&H Split Second Control . . . the special shock absorbing construction . . . the sensitized power clutch . . . the easier control . . . that makes it possible for operators to get more done in a day's work with less effort. These are the fellows that are piling up the evidence of P&H superiority everyday. Ask one of 'em. He'll tell you!

HARNISCHFEGER CORPORATION

Established 1884

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MILWAUKEE, WIS.

Warehouses and Service Stations:

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LOS ANGELES

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P&H the 50th year



Excavators . . . Cranes . . . Hoists . . . Arc Welders

RAYMOND



the ROLLER MILL of

For results at low cost—get a Raymond. This is the "good word" that experienced producers are passing along to prospective buyers of pulverizing equipment. They know from their own operating records that this modern machine pays big returns on the investment by increased savings in power, labor and upkeep.

You will find in the latest type of Raymond Roller Mill such important advantages as the *pneumatic feed control* for maintaining the output at maximum for all conditions of feed—*wide range classifica-*

tion from the average commercial fineness up to 99.9% through 400 mesh for micron material—*available capacities* for all requirements up to forty tons per hour—*improved oil journal* that reduces maintenance and lubrication costs to new low figures.

In addition, consider the extra value of the Raymond Roller Mill, equipped as a Kiln Mill, to *dry and grind* in one operation, reducing by half the cost of pulverizing such materials as limestone, gypsum, clay and many other rock products.

Write for operating records on installations of Raymond Roller Mills, handling products like yours.

TODAY



RAYMOND BROS. IMPACT PULVERIZER CO.

Main Office and Works:

1307 North Branch Street, CHICAGO

Eastern Office: 200 Madison Avenue, New York. Western Office: San Fernando Bldg., Los Angeles.

ANNOUNCEMENT

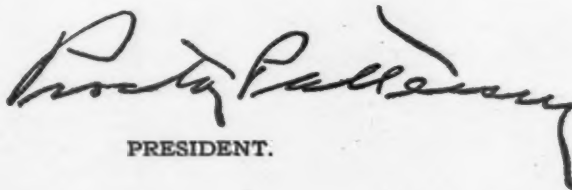


The W. S. Tyler Company is pleased to announce that it has acquired all the United States patents and pending patent applications under which a complete line of vibrating screens, washing and scrubbing apparatus has heretofore been manufactured by the Niagara Concrete Mixer Company, Buffalo, New York.

Effective immediately, all orders for screens, scrubbers and screen replacements, heretofore manufactured by the Niagara Company, may be sent direct to The W. S. Tyler Company at Cleveland, Ohio.

For the protection of present users of Niagara Screens and Scrubbers, it is planned to carry at Cleveland an ample stock of repair and replacement parts and to render a prompt and efficient service in this respect.

THE W. S. TYLER COMPANY,


PRESIDENT.

Cleveland, Ohio
July 11th, 1934

IT PAYS TO KEEP MACHINERY IN PROPER REPAIR

- The tendency in dull times is to economize by omitting necessary repairs to machinery.

- But even a depression might not justify risking ruination of machinery representing a large investment, for want of a few inexpensive replacement parts.

- Not only is there the danger of injury to the machine, but a breakdown, when it occurs, usually comes when the machine's capacity is most required.

**Idle periods are an opportune time to overhaul;
busy periods require the machines to be kept up.**

- AND REMEMBER, when obtaining repair parts, that the manufacturer of the machine for which they are intended has gained experience with many similar machines in other plants—that he is constantly making improvements in those parts based on this experience—that his shop is equipped with tools specifically for the manufacture of such parts—that he is interested in supplying parts that will assist in obtaining the highest efficiency from the machine itself—that the parts are usually made to templet, making easy changeability—and that many of the parts are patented and that in many cases repair parts come under the specific N.R.A. Code that covers the machine proper.

F. L. SMIDTH & Co.
225 BROADWAY NEW YORK, N. Y.

Manufacturers of CEMENT MAKING MACHINERY

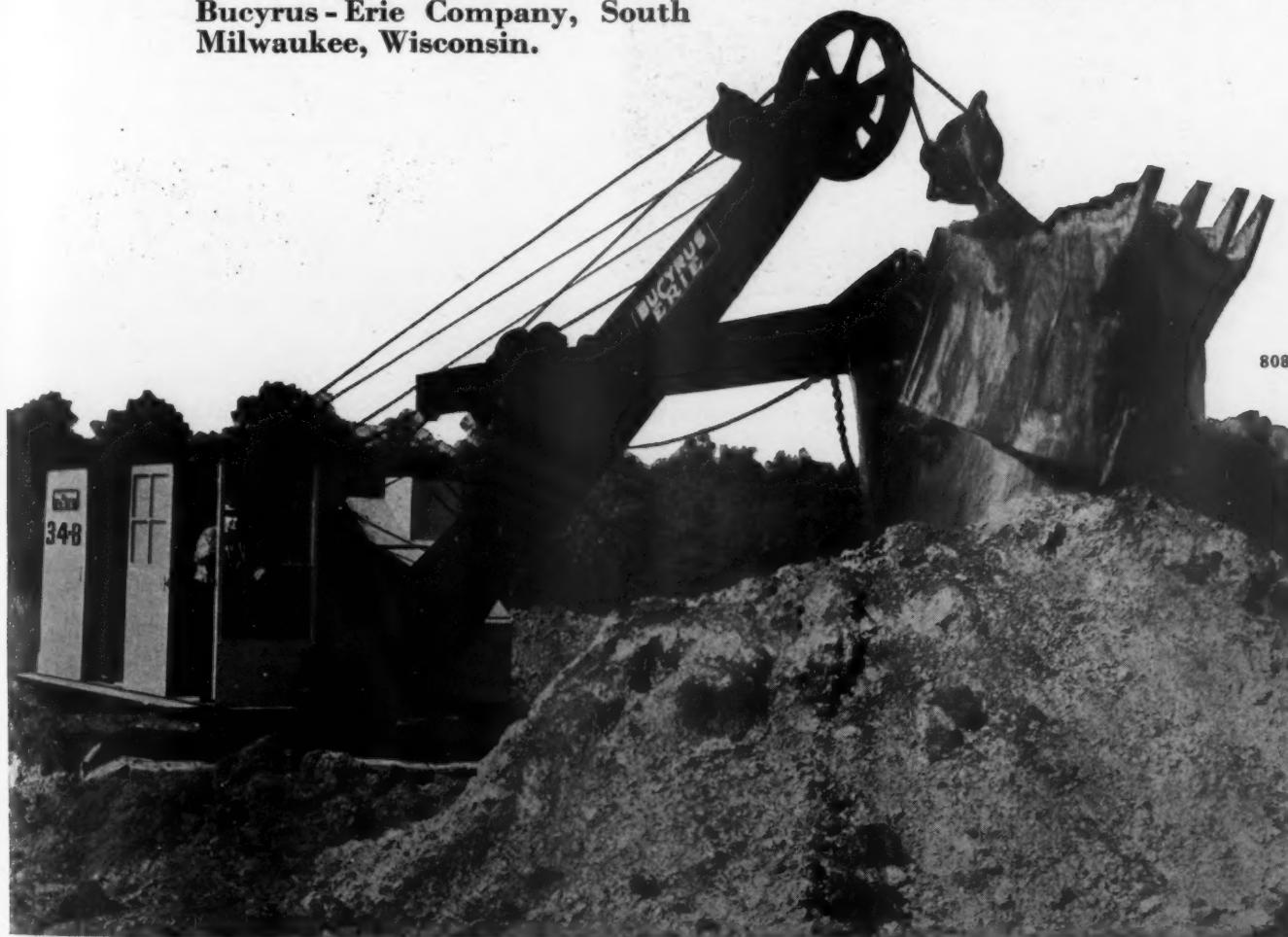
Designers of CEMENT MANUFACTURING PLANTS

New $1\frac{1}{4}$ -Yd. **BUCYRUS ERIE** 34-B

***... fully convertible shovel,
dragline, clamshell, drag-
shovel, lifting crane***

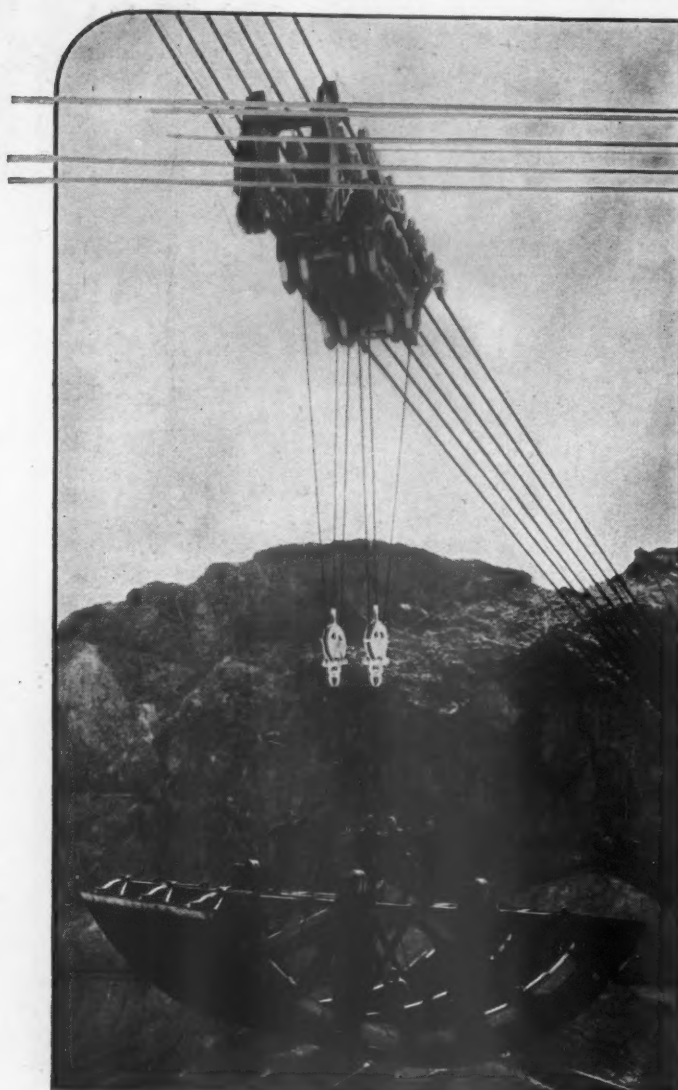
GASOLINE • DIESEL • ELECTRIC

115 H. P. 6-Cylinder gasoline engine ... shovel weight 34,000 lbs.
... anti-friction bearings ... all-welded shovel boom and sticks
... extra large boom-point sheaves ... enclosed gears running in
oil ... three-side-vision, all-weather cab ... famous Bucyrus-
Erie enclosed, bevel-gear swing unit ... easy-operating levers ..
booster-set controls ... adjustable, upholstered, spring-mounted
operator's seat ... inserted-tooth dipper ... single-shaft drive
mounting ... balanced value ... Write for full information ...
Bucyrus-Erie Company, South
Milwaukee, Wisconsin.



BUCYRUS-ERIE

THE AIR ROADS ARE ALWAYS OPEN



"SKY-TRACKS" FOR BOULDER DAM



The World's Heaviest Duty Permanent
Cableway—150 Ton Capacity

HIGH above the Black Canyon of the Colorado River man has stretched a slender web of steel—built "Sky-Tracks" across the abyss that for centuries seemed impassable. The Lidgerwood Cableways—essential to the completion of Boulder Dam—represent spans of from 1365 to 2575 feet. To assure maximum service and economy—they are equipped with American Steel & Wire Company Track Cables. With breaking strengths in excess of 500 tons each—they enable safe and rapid movement of materials and supplies. In connection with your own aerial transportation problem—whether it be large or small—you will find American Steel & Wire Company quality and service of exceptional value. We invite you to correspond with us.

1831



1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

Empire State Building, New York
First National Bank Building, Baltimore

Export Distributors: United States Steel Products Company, New York

Rock Products

With which is
Incorporated

CEMENT *and* ENGINEERING
NEWS

Founded
1896

Volume XXXVII

Chicago, August, 1934

Number 8

Recovery Progress—Trends

FOR A TIME during the middle of July it looked as though two of the major codes in the rock products industry would be mutilated beyond recognition, in an effort to make them conform to a new cure-all price policy developed by the various "experts" within the NRA. At this writing the immediate danger seems to have passed, but there remains hanging over these industries, and over all industry, a prospect that open-price plans, sales-below-cost and production control provisions of codes will sooner or later be scrapped, or so toned down that much of their value will be lost—at least according to the present opinion of many producers, who freely express the opinion, in private, that the codes are about ready for the ash can, if these changes are made.

Worse, however, than the proposed changes in the codes was the wholly unlooked-for executive order of the President, dated June 29, inviting bidders on government requirements to cut prices posted under their codes up to 15 per cent, with the assurance that they would not be held to have violated their codes by so doing. The President told the press at the time he issued the order that the public would be given the advantage of any price cuts the government could thus gain because the low bidder would be compelled to file this cut price with the code authority of his industry. Here was the Government itself attempting to destroy the elaborate setup of the NRA and the code authorities designed to provide stability of prices, worked out in a year of the hardest brain effort business men have ever experienced. No wonder business men were dismayed.

Since then the NRA has attempted to interpret the President's order by insisting that the prices bid the Government shall not affect existing prices posted for the public, but shall merely be made public as a matter of information. The distinction is a fine one if the bidder is inclined to be a price-cutter, because he certainly would not be prevented from making his government price general if he so desired. Anyhow, in the case of most of the rock product industries

the government in one way or another is about the only buyer at present.

Drive to Cut Prices of Building Materials

The President's order was in line with a drive, in which the NRA itself is participating, to bring about reductions of 15 to 20 per cent in the retail cost of building materials on the theory that this would encourage the use of the money made available under the new housing act. The lumber industry did announce a 10 per cent cut in retail prices, and subsequently a similar cut in manufacturers' prices, to both of which the newspapers have given much publicity.

Secretary Dern Joins Anti-Cement Faction

On June 28, the day before the President issued his order about the 15 per cent price cuts on government bids, Secretary of War Dern gave his first interview to newspaper reporters in several weeks. He called them in to make an important announcement. A New York press correspondent describes the interview in part as follows: "His ringing announcement was that the War Department had rejected bids for the delivery of cement to the army project at Fort Peck dam, Mont. He had discovered, he said, that all the bids for cement delivery at the job were identical—\$2.70 a barrel—regardless of shipping distance. Now the army wanted 600,000 barrels of cement. Dern, vigorously reading from a prepared statement, denounced the collusion of the bids, and then, somewhat as an anti-climax, admitted that he was buying 200,000 barrels of cement at the outrageous price because this amount was needed immediately."

Job Insurance in Effect in Wisconsin

All employers in Wisconsin of 10 or more workers for 18 weeks or more yearly were made subject to a state unemployment insurance act on July 1. As Wisconsin has pioneered in much socialistic legislation that subsequently became general the following should prove interesting to all employers elsewhere as evidence of a very marked trend: Under the law the commission was

required to publish the fact of business recovery before the machinery could be set in motion to make the unemployment insurance law effective. These findings showed that during the nine consecutive months from July, 1933, to March, 1934, the number of manual employees had been at least 20 per cent greater in Wisconsin manufacturing establishments than in December, 1932. It was also found that a 50 per cent increase over the December, 1932, figure was noted for the aggregate weekly pay rolls for three consecutive months of August, September and October, 1933.

Decision for compulsory operation was based on the commission's finding that only 376 employers hiring fewer than 50,000 workers had submitted voluntary unemployment insurance plans toward the specified quota of 139,000 workers set as the minimum number to be enrolled in an approved voluntary compensation program before May 18, to suspend the compulsory feature of the act.

While the act became effective on July 1, at which time contributions to individual or state unemployment insurance reserve funds began, payments from these funds will not begin until July 1, 1935. This will permit employers coming under the act to make contributions for one year to build up reserves. Benefits to qualified employees range from \$5 to \$10 weekly for a maximum of 10 weeks of complete unemployment yearly.

Employers are offered the option of operating under the standard contribution and benefit provisions of the act, depositing their reserve funds with the industrial commission and the state treasurer, or of setting up their own approved reserve systems.

The standard plan requires employers to contribute 2 per cent of the total pay roll of workers who are eligible for benefits. When the reserve reaches \$55 for each employee within two years, the contributions are cut to 1 per cent at which they continue until a reserve of \$75 per employee is accumulated or re-established after payments have been made.

The employers, under the voluntary plan,

may set up their own reserve under supervision of the commission or offer an acceptable guarantee of 42 weeks' employment yearly for their workers. Employers whose financial condition is approved by the commission may avoid cash contributions to reserve funds by setting up "book reserves," subject to conversion into cash benefit payments when necessary.

Industrial Loans Should Be Made Through Banks

The conditions under which the Reconstruction Finance Corporation will make direct loans to industry were given briefly in *ROCK PRODUCTS* for July. Since then the chairman of RFC has stated: "In discussing the question of industrial loans with the President, prior to the enactment of the law by Congress, he stated that he especially wanted the smaller and medium-sized industries to be given a full chance to survive on equal terms with the larger industries.

"A great majority of these loans will be small, but some industries will need more than the RFC can lend to any one borrower—namely \$500,000—limited by law; but if the Federal Reserve Banks, the RFC, and local banks will cooperate, each participating in such loans, these applications can be accommodated.

"I want especially to call attention to the fact that Congress also authorized the Federal Reserve Banks to discount this character of loans, with maturities running as long as five years, and this amendment to the Federal Reserve law should enable and encourage local banks to make many of these loans, or at least to participate substantially, in cooperation with the Federal Reserve and the RFC.

"The business and industry of our country should be financed by the banks, and we should all work to that end—that is, to the reestablishment of private credit. The RFC will cooperate with the Federal Reserve banks and local banks, wherever situated, in providing credit needed to meet the present emergency, including loans of the character we are now discussing, but we want to do it in such a way as to be able to pass this credit function back to regular banking channels at the earliest possible moment. I want to make perfectly clear, however, that until credit is actually being extended to deserving borrowers the resources of the Reconstruction Finance Corporation will be available to all those to whom we are authorized to lend."

Housing Act Prospects

So far as any one outside knows there has been no great rush for government money for building modernization. *Printers' Ink* recently gave a sane analysis of the work ahead, quoted in part as follows:

"With the passage of the Federal Housing Act, advertising is offered its biggest job since the depression began. It is conservatively estimated that there are somewhere

between 16,000,000 and 20,000,000 buildings requiring modernization and renovation. The Housing Administrator, James A. Moffett, has estimated that as much as \$500,000,000 may be spent by fall under the spur of the Housing Act.

"Unfortunately, at the moment there is great danger that a lot of the estimable gentlemen who are sitting about comfortable executive offices figuring the potential profits from this tremendous campaign are overlooking the fact that the amount of money to be spent by the home owners of the United States is going to be determined pretty largely by the amount of effort that is put by the manufacturer behind his merchandise and the housing idea. Many of these gentlemen, have been making high, wide and handsome predictions without having read the Act or without really investigating what is going on in Washington.

"There are certain facts that stand out.

"In the first place, the Government today does not contemplate spending a single, round, depreciated dollar in advertising.

"In the second place, the Government must depend upon manufacturers and bankers to put over the campaign.

"Third, the Government has already made some tentative and unofficial overtures to business. It is reliably reported that recently a member of the Housing Administration held group meetings with advertising agency men in an effort to work out some kind of consistent program.

"Fourth, it is possible—although it is too early for the Housing Administration really to work out definite plans—that manufacturers who will be affected beneficially by the Act will be asked either to donate a certain amount of each advertisement to propaganda for the Act or else to give space outright which will be used entirely for propaganda.

"Fifth, the general public—and it is the general public that is going to pay the bills—knows very little more about the Housing Act than it did before that Act was passed. Somebody some way has got to do the educational job with the public in order to loosen up frozen bankrolls or those recently accumulated bankrolls held by people who not so long ago were broke and who still are badly frightened."

Private Spending Must Come to Rescue

It does not now seem probable that there will be any great change, either for better or for worse, in the volume of general business activity during the second half of this year. Colonel Leonard P. Ayres, vice-president of the Cleveland Trust co., declares in the current issue of the *Business Bulletin* of that institution.

"The high level of federal expenditures for general expenses, public works and for agriculture relief will tend to sustain consumer purchasing power and so support retail trade and the production of consumption goods," he states. "On the other hand pro-

duction of durable goods remains far below normal and that continues to be responsible for most of the industrial unemployment."

The banker-economist states that it has become impressively evident that the task of creating conditions that will encourage private enterprise to expand business operations sufficiently to absorb most existing unemployment is too great to be accomplished by public expenditures. The hope that the outpouring of public funds can stimulate private business to normal activity is becoming dim, he states.

Commenting on existing conditions he says that, while employment and payrolls are greater than they were last July, the volume of industrial production is considerably less.

"The national housing act is perhaps the most important new element in the program of the national administration for aiding recovery this year," Colonel Ayres states.

"The project is of the first importance, for the building industry has been harder hit by the depression than almost any other and has shown as yet a minimum of recuperation so far as privately financed activities are concerned."

Experience probably will show that the greatest shortcoming of the act lies in the fact that it is mainly designed to promote the construction of one-family homes, he asserts. "These are important and in the earlier prosperity periods they have accounted for large aggregate expenditures for new construction; nevertheless they normally constitute in this country only a small part of the new building that is undertaken," he added.

Revised Code Rejected by Steel Constructors

An important test of the authority of General Hugh S. Johnson, administrator of the NRA, is in prospect as a result of the action of the directors of the American Institute of Steel Construction, Inc. Not only has this board refused to accept changes in the code of fair competition contained in an order by General Johnson on July 11, but the entire code has been rejected. The code was to have gone into effect July 22, and the next move is awaited from General Johnson. The directors of the steel construction institute have refused to act as code authorities, and contend that there is nothing in the law which can compel them to take over this obligation. Particular opposition developed to the fact that NRA struck out from the code the right of the steel construction industry to terminate the code upon a vote of its members. This right is contained in the code for the iron and steel industry, but was taken out of the construction code. It is asserted that under the plan of General Johnson, he would have authority by code executive orders to make any changes in the code without consent of the members of the industry, and this was a second matter which aroused almost unanimous opposition.

NRA Disturbs Cement and Aggregate Industries With Proposed Code Amendments

IN LINE with the provisions of its new standard code for the present uncoded industries, the NRA within one week sprang a lot of suggested amendments to the existing codes of the cement, and crushed stone, sand and gravel, and slag industries, which met with stout resistance on the part of these industries. Should the amendments be forced into the codes, which is very improbable at this time, the codes would cease to be voluntary ones, and would therefore hardly come under the NIRA.

The nature of the amendments suggested were the same in both instances. The labor advisory board and legal division sought to wipe out the tolerances for longer work days originally allowed because of the seasonal nature of the industries and to limit the work day to 8 hours a day and 40 hours (in the cement industry 36 hours) a week for all classes of employees except watchmen and emergency repair workmen (not to exceed 5 per cent) and the latter to be paid 1½ for time over 8 hours. Other amendments proposed would further add to the cost of production.

The amendments proposed by the consumer advisory board and the planning and research division had to do with the open price plan and follow the standardized provisions announced by NRA some weeks ago. They give the NRA the right to step in and prevent "wilfully destructive price cutting"; eliminate the price lags in the codes, and make posted prices applicable immediately, instead of after a 5- or 10-day period; require the price reporting to be done through "a confidential agency," eliminate uniform terms of sale, discounts, etc., eliminate enforced uniform cost keeping, eliminate the sales below cost and production control features of the codes.

New Price Policy Explained

The proposed amendments, as was pointed out by industry spokesmen, are statements of general principle and are too indefinitely worded to serve as code provisions. The exact wording of the proposed code provisions is not so important as the idea back of them, for it is obvious that they will not be forced on industry in their present form. On the other hand industry should understand the reasoning behind them, for in all probability the codes will eventually be revised to include their purpose. Here is the NRA's own explanation and it should be absorbed because this "new price policy" is sure to be heard of again:

"To understand the new NRA price policy it is necessary to know just what it is intended to accomplish. The policy, in essence, seeks to provide a means by which

disastrous price collapse may be instantly halted before wage levels can be drastically reduced and values destroyed without advantage to anyone.

"For many years an earnest search has been going on for a positive policy that would work and yet preserve the benefits of competition, which has been jealously guarded for American business.

"In the past, secret prices, rebates, and many other recognized unfair practices were constant disturbances. The remedy for these abuses seemed to be open publication of price lists, but unfortunately there was no recognized legal means to achieve price publicity for manufactured articles similar to those that exist for securities in the stock market, for agricultural commodities in the various exchanges, or even for articles offered for sale in retail stores.

"Under the new plan, an industry, if it chooses, can require all its members to file prices with an impartial agency, which prices are then available to buyers, sellers, and if need be, to the Government. The filed price includes discounts, rebates, allowances, terms and conditions of sale, and thus a complete picture of the price structure is available to the trade at all times.

Protects in Emergency

"Another troublesome factor in selling has been the relationship of cost to prices. Many people have earnestly contended that no sales should ever be permitted at less than cost, despite the fact that the buyer places a price which he is willing to pay. When the codes were being drawn, many 'selling below cost' provisions were inserted, with plain intent of the Administrator to experiment, with the hope that the best provision would fight its way to the front by sheer merit and workability. By specific command, the Administrator directed that these various provisions be critically studied in the code operations, and the present policy is the result of the observations of the boards and policy officers, aided by the valuable technical help of the various associations of accountants.

"The new policy recognizes that price maintenance is at best difficult to achieve without (a) the possibility of monopoly, or (b) the necessity for Government control, both of which are distasteful to the American people. The policy provides definitely, however, for fixed prices when there is a real emergency that adversely affects small enterprises, wages, or labor conditions, or tends toward monopolies.

"In short, the emergency provisions are tied directly to the purposes of the act, and are intended to prevent those violent and ex-

plosive happenings which would defeat the act.

Acts When Threatened

"Rather than at any time attempt to regulate every phase and condition of every transaction of American business, the new policy says in effect: 'I stand ready to act immediately when destruction is threatened.' This is a positive policy—one that distills the national experience with anti-trust and other restrictive laws, trade commissions, the war-time price control mechanisms, and the codes to date—a policy that states directly what can be done, with a minimum of interference with private business except when national policy is involved, and then only until the business can right itself.

"Wilfully destructive price competition is recognized as an unfair trade practice and provision is made for review of prices, particularly those which seem to have been quoted for the sole purpose of destroying competitors. Upon complaint, the code authorities are directed to investigate, and make a ruling in 14 days. If the ruling is not accepted by either party, all the papers are forwarded to the NRA for immediate and final action. That's simplicity and action.

Ignorance of Costs

"A word or two about cost accounting. The new policy recognizes the tremendous advantages of knowledge of costs, and that many businesses are destroyed through ignorance of costs. New codes will provide that principles of cost estimating, suitable to all members, are to be recommended, but not made compulsory. In this way, it is hoped that sound and intelligent accounting records will be built up in every industry, and that facts will take the place of guesswork for industrial planning.

"To summarize—the policy aims to give greater publicity to prices, to prevent coercion and undue influence which raise prices to consumers, to substitute knowledge for ignorance in accounting, to remedy quickly vicious price cutting, and above all, to establish stated minimum prices in emergencies that threaten the recovery program."

Editor's Conclusions

From the quotation given it is entirely clear what NRA is driving at, and this objective should not be at odds with that of industry itself. Industries will have to operate under their own codes so as to approach this objective, or it is clear their codes will have to be changed.

Full reports of the latest hearings on the crushed stone, sand, gravel and slag industry code, and on the cement industry code are on the following pages.

Cement Code Amendments Subject of Debate at Hearing

The seriousness of the hearing—in the opinion of cement company executives—may be judged from the fact that 48 companies were represented, many of them by their presidents, some by nearly all members of their executive staffs. These cement manufacturers confined their activities (1) to a rather complete but involved defence of its present capital and physical set-up; (2) to introducing and advocating as an amendment to their code a new Article XI on methods of selling and marketing cement, some changes in the labor provisions permitting longer working days for particular employees; (3) to objecting most forcibly to the amendments proposed by the Labor, Consumer and Planning Boards of NRA.

The rest of the hearing was devoted to briefs by labor representatives advocating universal adoption of a 6-hr. day with time and a half for over-time; briefs by representatives of the ready-mixed concrete industry, who under the proposed new Article XI would have to buy their cement from competitive builders' supply dealers; a brief from the contractors that the dealers would get more business than they were entitled to; a proposed amendment to the code submitted by a West Coast cement manufacturer who ships a large part of his output by truck and wants his truck scales to serve as a measuring stick for bulk cement (the code requires railway scales); briefs by builders' supply dealers, one group wanting more and one expressing half-hearted acquiescence to the proposed new Article XI; and, strange enough, a fine sales letter from a West Coast oil man who has a limestone property, which he contended was ripe for development into a cement manufactory!

Capital Structure of the Industry

B. H. Rader, chairman of the Code Authority for the Cement Industry, put into the record a long letter of John Treanor (president, Riverside Cement Co.) to the chairman of the Federal Trade Commission, dated June 23, 1934, in which Mr. Treanor endeavored to refute certain contentions of the commission: (1) that the cement industry is over-capitalized; (2) that it is extravagantly overbuilt with reference to the normal demand; (3) that much of its equipment is obsolete; (4) that its marketing practices are monopolistic. The letter had no direct bearing on the hearing, but was obviously a frank endeavor to clear up a number of much publicized misconceptions regarding the industry.

The following extracts from Mr. Treanor's letter will serve to show the nature of his argument, as well as supplying data in regard to the cement industry hitherto not available. The general average "replacement" cost of a cement plant at the present time is estimated as follows (replacement

here meaning new equipment to provide the same capacity, and not "reproduction" of existing equipment):

REPLACEMENT COST OF A CEMENT PLANT PER BBL. OF CEMENT (At rated annual capacity)	
Land and deposits.....	\$0.25
Cement plant equipment.....	1.65
Waste—heat power (adjusted to a 35% basis; 35% of present production being so equipped).....	0.14
Total fixed capital.....	\$2.04
Working capital.....	0.37
Total capital required.....	\$2.41

The total investment in the industry, as carried on its books, according to recent audits, including working capital and funded debts is \$1887 per bbl. of rated annual capacity (clinker). Funded debt represents but 18% of the present capital structure. In other words the present industry is capitalized at something like 20% less than its replacement value.

Excess Capacity?

Mr. Treanor discussed at length what "capacity" of the cement industry means, or what it is. He takes the figure 251,400,000 bbl. as the "rated" clinker capacity and 213,690,000 bbl. as the "effective" capacity, which is arrived at both theoretically and from the records of plant operation—the effective capacity being 15% less than the rated capacity due to enforced shutdowns, seasonal and for repairs. This figure checks with the summation of actual clinker production for the peak years of all the plants.

Cement manufacture being a local industry, and depending on local activity of construction, does not find all the plants at their peak production at the same time, or in the same year. Consequently the tendency of manufacturers has been to build new plants and enlarge old ones to meet these local peaks of demand without much regard to the capacity of the industry as a whole. Had the cement industry failed to meet these temporary local demands, outside capital would have done so, and did so in several instances. Mr. Treanor contended that it is necessary for the cement industry to maintain large capacity for seasonal cyclical (construction cycles) peaks of short duration.

The effect of this constant excess capacity on prices has been to keep the market a buyers' market and has led naturally to price wars, in which the cost to make cement has been forgotten in the desire to maintain a going concern. When these price wars had exhausted the resources of all the manufacturers, there did not need to be any secret agreement for them to follow the announcement of a leader, whose word they could depend on, that his prices had been advanced. This, according to Mr. Treanor, accounted for the coincidence and

uniformity of price advances, about which there has been so much publicity.

Probable Consumption

Mr. Treanor's letter contained quite a philosophic analysis of probable future demand for cement, in which he showed his West Coast optimism by refusing to believe there will be any diminution of the per capita use. Indeed, he believes per capita consumption will increase. However, for the purpose of argument he takes a figure of 0.9 bbl. per capita per year (15% less than the 20-year average 1914-1933) and concludes that the decade we are entering, 1934-1943, will see an average annual consumption of 120,000,000 bbl., with a plus or minus deviation of 30%. In other words there is a possible yearly peak demand of 156,000,000 bbl. On this basis he estimates an effective total rated capacity of 200,000,000 bbl. is easily justified; and if the capitalization of the cement were reduced to this needed 200,000,000 bbl. capacity, the capital investment per bbl. of capacity would be little different from the present replacement cost (\$2.24 against \$2.41).

Obsolescence

In defending the industry against the Federal Trade Commission's charge of maintaining obsolete plants, Mr. Treanor's arguments were logical but to some, perhaps, not so convincing. He stated that there has been no significant changes in type of cement-plant equipment in the last 10 years—that whatever development there had been was merely in the direction of larger units, and in labor saving and power saving. He now doubted the wisdom of larger units since with part-capacity operation smaller and more flexible units are more desirable. Plant betterments in the last ten years which did not increase capacity amounted to an estimated total of \$150,000,000. The difference between present day replacement cost of \$2.04 per bbl (capital investment in equipment only) and the existing capitalization of the industry on a 200,000,000 bbl. capacity basis of \$1.87 per bbl. would provide a hypothetical fund of 17c per bbl. or \$34,000,000 for further modernization of existing plants before there is a necessity for plant replacement.

Mr. Treanor stressed the fact that some old companies with experienced and efficient personnels were able to operate old plants more efficiently than some of the newer ones were operated. He did not mention quality of product nor make a comparison with the newer plants when efficiently operated. There is, however, as he pointed out, a great difference between the cement industry and many others where obsolescence is quickly recognized and old equipment replaced with new. In those industries the operating costs are relatively large and the capital costs small. In the cement industry the reverse is true, capital costs are relatively large and operating costs low. He, therefore, suggests this definition of obsolescence:

"Equipment is obsolete when it can be replaced by new equipment so as to effect a saving in overall cost"—the overall cost being the criterion and not merely the operating cost.

Mr. Treanor claims that the efficiency of an old plant that has been properly maintained is such that it can give a new plant a close run even in direct operating costs. The most savings a new plant can make over an old one, he estimates as follows: One-tenth of a man-hour per bbl., 4 to 5c; fuel saving 20 to 25%, 3 to 5c; power saving, 4 or 5 kw.h., 3 to 4c—a total of 15c per bbl. On the other hand, figuring a 60% utilization of plant, the interest cost of the new plant would amount to 19c per bbl. at 7%, and depreciation at 5% would be 13½c per bbl. more. Hence, he figures, any one who scrapped an old plant 20 years ago to build a new one is operating today at a much higher total cost than if he had retained his old plant, even if the full 15c saving in direct cost had been realized.

That there are some inefficient plants in the industry, Mr. Treanor admits, but he says they are inefficient "not so much because their equipment is obsolete in the true sense, as because their management is incompetent." He said: "There is scarcely a district in the United States where plants of the oldest type have not been producing cement alongside the newest plants, throughout the depression; and apparently they are prepared to do so indefinitely."

Costs—Fixed and Variable

Mr. Treanor frankly discussed sales costs, which range from 8 to 15% of the selling price of cement. Sales and administrative and mill operating overhead are constant costs, he pointed out, regardless of volume; the only clearly variable costs are fuel, supplies and power, and an important part of labor. From his own experience, Mr. Treanor estimates the cost of cement manufacture is 60% constant and 40% variable. In 1929 the gross value of the product of the industry as a whole was 41% of the capital invested. In 1932 it was 17%.

Ready-Mix Concrete Producers Object

Left out of the new Article XI as eligible to buy cement direct from manufacturers, the ready-mixed concrete industry entered vigorous objections. Stanton Walker, executive officer of the Code Authority for the industry submitted a brief in which he stated there were 300 to 350 concerns in the ready-mixed concrete business, and that their annual requirements were 5,000,000 to 10,000,000 bbl. per year. As the result of a hasty questionnaire he had determined that 79 producers were in favor of buying cement direct from manufacturers and 22 were in favor of buying through dealers, but 19 of these 22 were dealers themselves.

Other representatives of the Ready-Mixed Concrete Industry who filed objections were J. H. Dixey, Transit-Mix Concrete Co., New York City; Alexander Johnson, Cen-

tral Concrete Mixing Corp., Brooklyn, N. Y.; H. F. Thomson, General Material Co., St. Louis, Mo.; Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio; J. E. Burke, chairman, Ready-Mixed Concrete Code Authority; J. L. Shiely, J. L. Shiely Co., St. Paul, Minn.

Builders' Supply Dealers Acquiesce

L. I. MacQueen, secretary, Code Authority of the Builders' Supply Industry, stated that it was "not the desire or the wish of the builders' supply industry at this time to oppose any of the proposed new Article XI." He said further: "While I would not go so far as to say that the industry in its entirety believes that this is the best that can be developed, we do feel that in the present state of our knowledge and with the present data which we have before us, and taking into consideration the difficulties which both industries are laboring under . . . it would be detrimental to both industries in any way to oppose this Article XI." A group of Texas builders' supply dealers protested the proposed changes in Article XI, which they contended would deprive them of practically all their l. c. l. business.

Opposition to NRA Amendments

Concluding the hearing, Charles F. Conn, president of the Cement Institute, said in part: "In a sense our appearance here today is not voluntary, for it would have been unnecessary for us to ask for this amendment had our original code remained unimpaired. Article XI which we came here to discuss deals with methods of selling and marketing cement. It constitutes economic planning in the field of distribution. Its aim is to bring order out of chaos; to establish methods of marketing cement which are fair alike to buyer and seller; to protect the legitimate rights and privileges of our various classes of customers under the different conditions which prevail in our industry. This Article has no relation to price fixing; it involves no attempt to set up monopolistic practices. On the contrary it seeks a square deal for all.

"This is the provision of our Code which was suspended in January, and the hearing today is a continuation of the hearing which was held at that time. We are here to pursue this unfinished business.

"The various advisory boards of NRA have taken this occasion to propose several other amendments to the cement code. The Labor Advisory Board would delete parts of Article III and part of Article X, and would add seven new provisions to Article III. The Consumers' Advisory Board would delete five sections of the proposed new Article XI, all of Article VIII, practically all of Article IX, and two sections of Article X, and would rewrite Articles VIII and IX for us and add a new section to Article XII, which in effect would eliminate the whole Article from the Code. The Legal Division would make changes in twelve parts of our code, affecting Articles I, II, III, IV, X and XII.

"This presents a very grave situation for the cement industry. If our code is to be altered in all of these particulars, then it will cease to have any semblance to a voluntary code. We submit that this is the fundamental issue.

"Perhaps we have misunderstood the purpose of our code and the intent of the Act. The NIRA, as we understand it, was based upon a recognition of national emergency. The Act declares the policy of Congress which was, in part, "to provide for the general welfare by promoting the organization of industry for the purpose of cooperative action among trade groups." If there is to be an end to voluntary codes there is an end too of any attempts to fulfill this purpose of coöperative action among trade groups.

"This consideration is broader than the merits of any specific proposals. If the NIRA is to be effective in accomplishing any of its aims—and the cement industry is sincerely desirous of promoting all of them—the codes of fair competition must, we believe, reflect the bona fide efforts of industries to govern themselves. If a code represents a plan of real self-regulation it will in large part succeed in rehabilitating industry and in accomplishing those other policies of the Act; if, on the other hand, voluntary regulation is to be supplanted by imposed regulation, then we gravely doubt that the Act or the codes will work.

"When we insist that the NRA codes must essentially constitute charters of self-regulation we, of course, do not mean that industry can write its own ticket to pursue a selfish purpose. The Act itself requires that certain provisions be written into codes and restricts the nature of the other provisions. Writing a code, we admit, is a process of give and take. But this process began when we presented our code a year ago. At that time some of the provisions that our industry wanted were given to us. But also at that time many of the proposals we made were denied us—at the instance of the NRA Divisions and Advisory Boards, which now want to take away from us most of what remains of our voluntarily submitted proposals.

"Does the give-and-take process mean that the industry does all the giving and the NRA does all the taking?

President's Order Blasts Foundations of Price Stability

"Nor can we disregard the fact that the give and take process has been going on in the same one-sided way through executive orders and administrative regulations. A series of executive orders has chipped away at these code structures in which industries have been housed and at last the foundations of these structures were all but blasted by the executive order of June 29.

"This last order affects all members of industries operating under open price plans—that is, fully half of all the industries operating under codes. The order invites members

of these industries to bid 15% under the price which they had posted. The whole purpose of the open price plan is to reveal all competitive facts that competition may be exerted openly, fairly, and intelligently. This order invites a return to primitive and unintelligent methods of competition.

"The uncertainty, misunderstanding, and confusion resulting from this order are bound to be followed by a series of interpretations. And this phenomenon leads to another serious consideration. No one can be expected to play the game when the referee continually changes the rules.

"But let us revert to the 41 changes which the Administration now proposes to make in the cement code. Generally speaking we feel that these changes would strip our code of all value as an instrument of self-regulation. Some of these proposals do not fit the problems in our industry. If these changes are imposed upon us, we fear that they will so weaken our safeguards and increase our burdens that the code will become impotent.

Labor Will Suffer

"Let us be frank about this. If our code fails, its labor provisions will fail with it. The Cement Industry does not want this to happen.

"While the great majority of other industries established a 40-hour week, the cement industry set its maximum time for factory workers at an average of 36 hours a week, thus anticipating the President's March request for a 10% reduction in the 40-hour week. In wages, too, we have done our share by setting a scale substantially above that which prevailed prior to the code, and which in some plants means hourly wages at higher rates than had ever been paid before. Furthermore, the cement industry voluntarily established these hours and wages more than four months before the effective date of the code. And all of this was done by these suppliers of capital goods and construction materials which suffered so drastically by the depression. These rates and hours for labor we cannot continue to assure if further burdens cast us deeper into costly chaos.

"We are well aware, Mr. Administrator, that from many sources there has been vigorous criticism of the cement code and of the Cement Institute which sponsored it. These criticisms have been adequately answered by the NRA itself, and we are especially satisfied by the intelligent and courageous explanations of our actions which have been made by the Deputy Administrator in charge of our code.

"We hope we have made it clear that, however much we may disagree with the Administration on methods of accomplishing results, we are most anxious to cooperate in achieving the purposes of the NIRA.

To Summarize

"First, the representatives of the cement industry are here for the specific purpose of reinstating Article XI as an integral and necessary part of our code.

"Second, our industry cannot afford to continue to pay the code wages or to abide by the curtailed working hours if we are to be stripped of the means to pay these increased costs.

"Third, every proposed amendment and every executive and administrative order makes us less able to pay these added costs.

"Fourth, when the NRA confronts us with proposals for a wholesale rewriting of our code, we feel impelled to stress fundamentals; to point out that one of the purposes of this emergency legislation was to encourage members of an industry to regulate themselves by proposing a code of their own devising, reflecting the aims of the industry itself, expressed in terms familiar to the trade, adapted to the problems peculiar to

that group, and fair to all concerned.

"Fifth, we believe that NRA codes will succeed only to the extent that those who are bound thereby will and can abide by them and make them respected. The failure of NRA to do anything to assist industry in the enforcement of trade practice provisions makes it doubly clear that the fate of this experiment in codes rests in the success of self-regulation.

"Sixth, we urge the Administration to give our industry a fair chance at self-regulation. In the midst of frequently changing orders, rules and regulations it has taken six months for the members of our industry to learn how they may avoid violation of their code. Now we ask a chance to give it a trial."

Budget and Amendments Discussed at Crushed Stone Hearing

AN EXPLANATION of the budget for administering the Code for the Crushed Stone, Sand and Gravel and Slag Industries and severe criticism of proposed amendments to the code offered by the NRA were given by Otho M. Graves, chairman of the Code Authority for those industries, at a public hearing before NRA officials in Washington, D. C., July 17.

The hearing was called for the purpose of considering a flood of amendments to the code proposed by the labor and advisory board and the research and planning division of NRA as well as to give Mr. Graves an opportunity to explain the \$1,133,404 budget, which includes \$238,100 for support of the code authority and \$875,304 for administration expenses of the various regional, district, state and division committees.

Answering complaints and protests of a number of the portable plant members of the industries, Mr. Graves told the hearing that the estimated cost of administering the code was no more than the amount required by the three trade associations to conduct their activities. The Code Authority, he argued, must of necessity engage in far more extensive activities than the trade associations and thus was performing a greater service for the same money. He cited the fact that the \$1,000,000 needed for administration expenses of the code was not out of proportion to the annual sales value of the industries' products. This sales value he estimated at \$160,000,000.

All Producers Should Be Made to Contribute

Mr. Graves said the burden of contributing to the code expenses thus far had been borne by the voluntary assessments of a group of "registered" members of the industries. These "registered" members, he explained, were those who had agreed to

come under the code. Thereupon, he proposed a number of amendments drawn by the Code Authority which would empower that body to levy assessments on all members of the industries.

Questioned concerning the method of determining individual assessments of members of the industries, Mr. Graves said the tonnage figures for 1932 had been decided upon by the authority for use as a computing base. He expressed the opinion that a better method of determining what each member should contribute would be to base these assessments on net sales, but declared such a plan was not favored by the industries, because of reluctance to disclosing any information concerning sales.

Mr. Graves also requested the NRA to terminate an executive order which exempts any member of a trade or industry from obligation to contribute to the expenses of any code other than the code which embraces his principal line of business.

He explained how a contractor-producer might function primarily on one job as a contractor and on another as a producer of aggregates. The spreading of the material on the roadbed, as is often done, is not a construction job. In all cases, practically, the contractor-producer is a competitor either of the commercial established plant or the commercial portable plant. Mr. Graves introduced into the record some very interesting data from the various regional code administration officers showing that without the inclusion of the contractor-producers code activities in numerous instances would be practically impossible. According to the chairman of the regional committee in Region 16 (Oregon, Washington, Montana and Idaho), about 50 per cent of the production comes from portable plants. In Region 14 (other Rocky Mountain States) the portable plant operators dominate the regional and district organizations. As far

east as Michigan the production from portable plant contractor-producers amounts to almost one-third of the total.

Associated General Contractors Protest

Burt L. Knowles, of the executive committee of the Associated General Contractors of America, appeared to oppose termination of the NRA executive order, which now exempts contractor-producers from paying to support the code of the aggregate industries. He submitted a prepared brief, which follows in part:

"We recognize the fact that the commercial production of mineral aggregates is an essential industry capable of serving many communities in a highly efficient and economical manner. We also realize that in many localities unregulated and unbridled competition has proved to be highly destructive to the industry, and has, in many instances, rendered it incapable of performing this service which under reasonably favorable competitive conditions it certainly can perform. The construction industry in many localities required this service and desired to do everything in its power to foster and aid in every way.

"On the other hand, there are other localities where to all intent and purposes there is no such thing as the commercial production of these mineral aggregates. In many sections of the country the commercial plants are located at great distances from each other and so, of course, from the construction operations which may be carried on in such regions. These localities are mainly to be found in parts of the South, Middle-west, and the Western states—districts which are commonly characterized as the 'wide open spaces.' In many instances large construction operations—notably highway work—are carried on 50 miles and more from the nearest railroad, and perhaps much farther than that from any commercial plant.

"Is it not clear that under such circumstances the production of mineral aggregates by a general contractor becomes a natural function and an essential and integral part of his business of general contracting. Such a contractor, when faced with these conditions cannot be said to be encroaching upon the field of any established industry. He is simply operating under the stern necessity of economic pressure. It is perhaps more often the case than not that he is compelled by the provisions of specifications under which he operates, to use local materials from definitely specified pits or quarries. In such cases, and there are many, it is manifestly unfair to enforce upon that contractor the provisions and administration fees of the code of an industry which, as far as he is concerned, is non-existent.

"Now it should be entirely clear that because of the widely varying conditions which prevail in the different states and localities it is not reasonable or practicable to hand down a single ruling which would be equitable and fair in all regions alike. In

"The industry is now engaged in estab-

lishment of permissive areas. It would appear that coincident with this activity some districting or area agreements could be developed which would establish fair competitive conditions in such localities as can be economically served by commercial producers and proper exemptions in other localities."

Portable Operators Protest

Richard Elliott, representing the National Association of Portable Stone, Sand and Gravel Producers, also opposed termination of the executive order. He likewise submitted a brief in support of his contention, which follows:

"We wish to draw the attention of the Administrator to the situation in which the contractor producers of the United States now find themselves subsequent to the approval of the budget for the construction industry and as a result of the probability of the approval of the budget submitted by the code authority for the crushed stone, sand and gravel and slag industries. A large number of portable producers in the United States are classified as contractor producers because they produce aggregates for the completion of contracts which they themselves hold. If these contractor producers are required to pay assessments to support the code authority for crushed stone, sand and gravel and slag industries and their subordinate committees and also assessments to support the code authority for the construction industry and its subordinate authorities, these contractor-producers will be required to support financially a minimum of six organizations established under these codes and a maximum of eight or more. We cannot feel that the NRA would permit such a ruinous burden to be placed upon the shoulders of the contractor-producers and we therefore earnestly petition that if it is decided to approve a termination of the exemption of the administrative order as requested by the code authority for the crushed stone, sand and gravel and slag industries, that contractor-producers be exempted from paying the assessments levied by the construction code authority and its subordinate authorities."

Mr. Elliott said his organization consisted of about 400 out of approximately 1,200 portable plant operators; about 15 per cent of the total production he classified as "commercial," the other 85 per cent was produced by highway contractors.

There were numerous protests from individual contractors and local contractor associations, particularly in the west and southwest.

Standard Cost-Keeping

Mr. Graves reviewed the progress of the industries toward the adoption of uniform cost-keeping and said that with the assistance of Ernst & Ernst, public accountants, systems had been worked out for the three industries, and he then formally presented the systems accepted by the Code Authority

and submitted to the NRA for its approval. The crushed stone representatives of the committee which worked out these cost-keeping systems were Bruce Campbell, Harry T. Campbell Sons Co., Towson, Md.; J. A. Conway, John T. Dyer Quarry Co., Norristown, Penn., and D. J. Kaufman, Marble Cliff Quarries Co., Columbus, Ohio. The sand and gravel members of the committee consisted of Anderson Dana, Seaboard Sand and Gravel Co., New York City, C. L. Ruffin, Massaponax Sand and Gravel Co., Fredericksburg, Va., and H. H. Stewart, J. K. Davison and Bro., Pittsburgh, Penn. The slag members were C. L. McKenzie, Duquesne Slag Products Co., Pittsburgh, Penn.; H. N. Snyder, Buffalo Slag Co., Buffalo, N. Y., and the industrial sand representative was T. C. Matthews, Pennsylvania Glass Sand Corp., Lewistown, Penn. Mr. Graves said the committee membership was designed to give representation to large producers, medium sized producers and the small producers.

Code Amendments of NRA Boards Opposed

Mr. Graves emphasized the fact that the series of proposed amendments to the code put forth by the labor and consumers' advisory boards and the research and planning division of NRA were received too recently to allow them to be adequately considered by the Code Authority or even its executive council, but the reactions of members of the industries had been secured by letter and wire and considerable data accumulated.

He then reviewed the proposed amendments, and with few unimportant exceptions stated that the Code Authority rejected them. He then read into the record much data to show that most of the labor changes had been proposed and rejected at the time the code was originally drafted. The changes proposed by the consumers' advisory board and the research and planning division were in line with those of their proposed standard new code for uncoded industries and would nullify the only parts of the present code that producers hope will be the means of rehabilitating their industries.

Concluding his very able presentation (even the representative of the Labor Advisory Board complemented this) Mr. Graves quoted a couple of paragraphs from an article in the July 14 issue of the *Saturday Evening Post* by Gen. Hugh S. Johnson, NRA administrator, in which he said that all the codes were voluntary, that the NRA had dictated nothing, and that the policy of permitting business to write its own code would continue; that the price provisions in approved codes would not be changed.

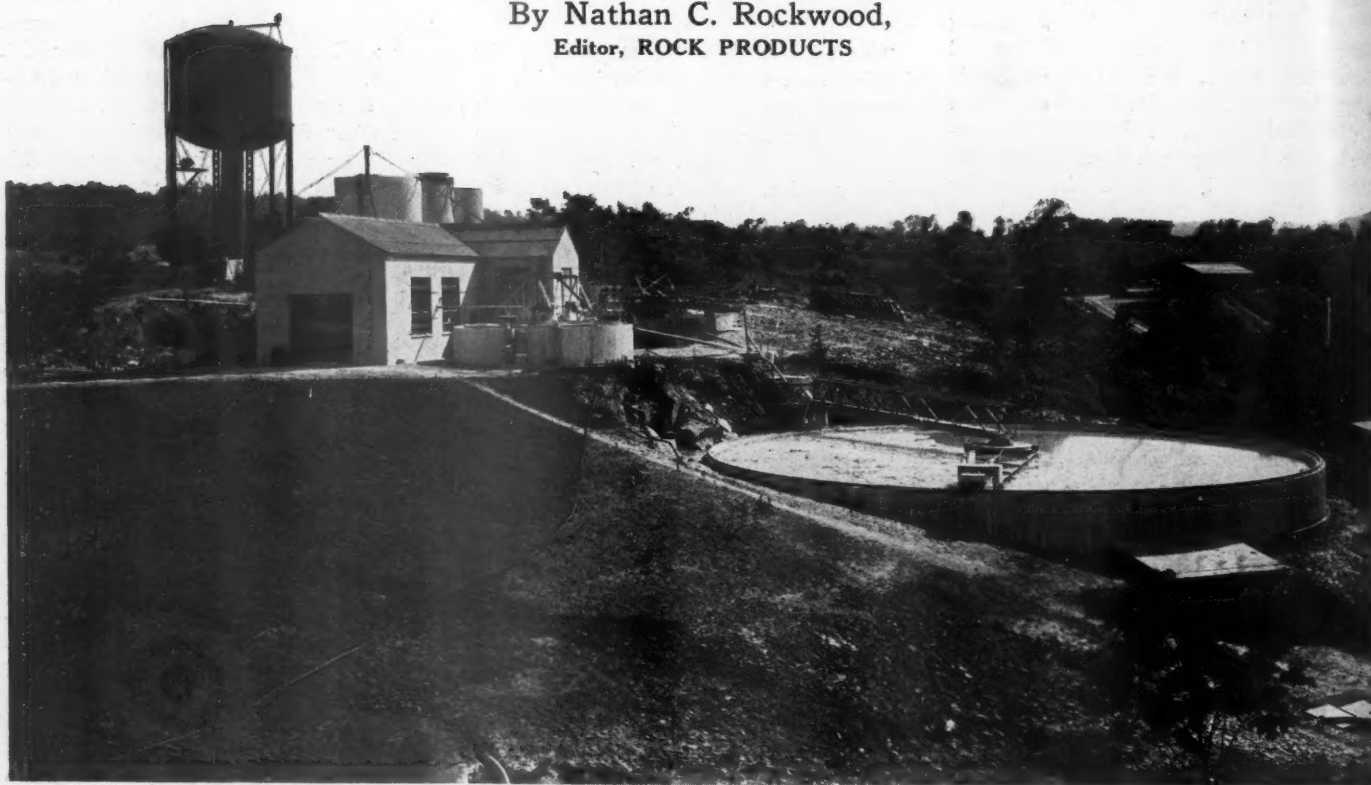
Of course, no decision was reached at the public hearing and whatever decision is reached later, through post-hearing conferences, will not be known for weeks, possibly months.

Besides Mr. Graves the members of the executive council and a few other members of the Code Authority were present.

Chemistry Applied to Cement Manufacture

For the First Time in the History of Portland Cement the Mineral Constituents in Raw Materials May Be Separated and Recombined in Desired Ratios—Valley Forge Cement Co. Makes Revolutionary Advance

By Nathan C. Rockwood,
Editor, ROCK PRODUCTS



Mineral separations plant of Valley Forge Cement Co., West Conshohocken, Penn., taken from a walkway on the side of the Cottrell precipitator building. The large water tank in the background is a part of the plant supply system. The concrete circulating water, slurry and make-up water tanks are in background. The calcite thickener is in the ell of the classifier and cell house. A centrifugal pump in the lean-to below the large thickener conveys the final composition to the kiln storage tanks

APLIED CEMENT CHEMISTRY, as every portland cement manufacturer knows, has consisted largely of maintaining a desired lime ratio to the other mineral constituents—silica, alumina, iron, etc. Many satisfactory cements have been analyzed and proportions of these various constituents determined. Raw materials are then sought, which combined in cement approximate as nearly as possible the necessary proportions. Of course, it has long been known that differences in the proportions of the minor constituents affected to marked degrees the properties of the resulting clinker and cement. Only recently, however, with the advent of "high alumina," "low alumina," "high silica," "high iron" cements, etc., have cement manufacturers made any attempt to change definitely the proportions of these minor constituents from those naturally provided in the raw materials avail-

able, in order to develop special properties in cements.

Both Quality and Cost Control

Naturally, there could be no application of real chemical control so long as chemists had to deal with crude raw materials. When more lime is necessary, a raw material containing a higher percentage of calcium carbonate is added. Where more silica and alumina are needed, a raw material is added which contains these. But in both cases such a thing as exact control of any of the mineral constituents is impossible because the materials added usually contain all the various constituents in varying proportions. And these proportions vary from day to day as different parts of the same deposits of raw materials are used.

The result is that no two cement clinkers are ever identical either in chemical composition or in physical properties. Nor is ab-

solute uniformity possible in cement made in the same mill from day to day. "Synthetic" portland cement, made from pure mineral constituents, in exact proportions, has been made in laboratories, but never in cement plants. Ordinarily, of course, the variations in cement are not serious, and with good raw materials and routine checking, the product is "standard." However, in many instances cement plant chemists do have difficulty in maintaining desirable uniformity of product, and this invariably by "blending" the product of many days' run of kiln rather than by actual uniformity of chemical composition of each particle of clinker, which certainly should be the goal of any really *controlled* chemical process. Likewise, the nature of the available materials frequently restricts or actually precludes the manufacture of several special types.

Entirely aside from this kind of chemical

control, desirable as it is for quality of product, is chemical control for economy of processing. It is notorious that cement clinkers vary greatly in grindability and in the amount of heat required to make them. It is generally appreciated that these variations are caused by small differences in the proportions of raw materials used, and in some degree to the physical and chemical forms in which these raw materials occur. Those familiar with the research work that has been done on silica and the element silicon know that this element occurs in various isotopes, or atomic variations, some of which are more active chemically than others, and that the activity of various forms of silica varies with changes of temperature. While less similar work has been done with alumina, it also occurs in various forms.

However, it has not been possible for cement plant chemists to take advantage of what little they have learned about their own clinkers, and why they are hard to burn, hard to grind, or both; because they have no choice in the selection of these raw materials. They are compelled to use, as best they can, what nature has supplied in their particular locality.

Therefore, the opportunity for large sav-

ings in processing costs where it is possible to work with relatively pure mineral constituents instead of crude ones is obvious. The accompanying table shows the variations in ratio of silica to alumina and iron in clinkers from a number of different plants and localities and illustrates how little attention has been paid to this detail; yet tests show quite conclusively that the best ratio for a minimum of processing costs lies in the rather narrow range of 1.85 to 2. Such close control is impossible with the ordinary raw materials. Further investigation, too involved to warrant discussion here, reveals how incorrect ratios profoundly influence the quality and strength of portland cement.

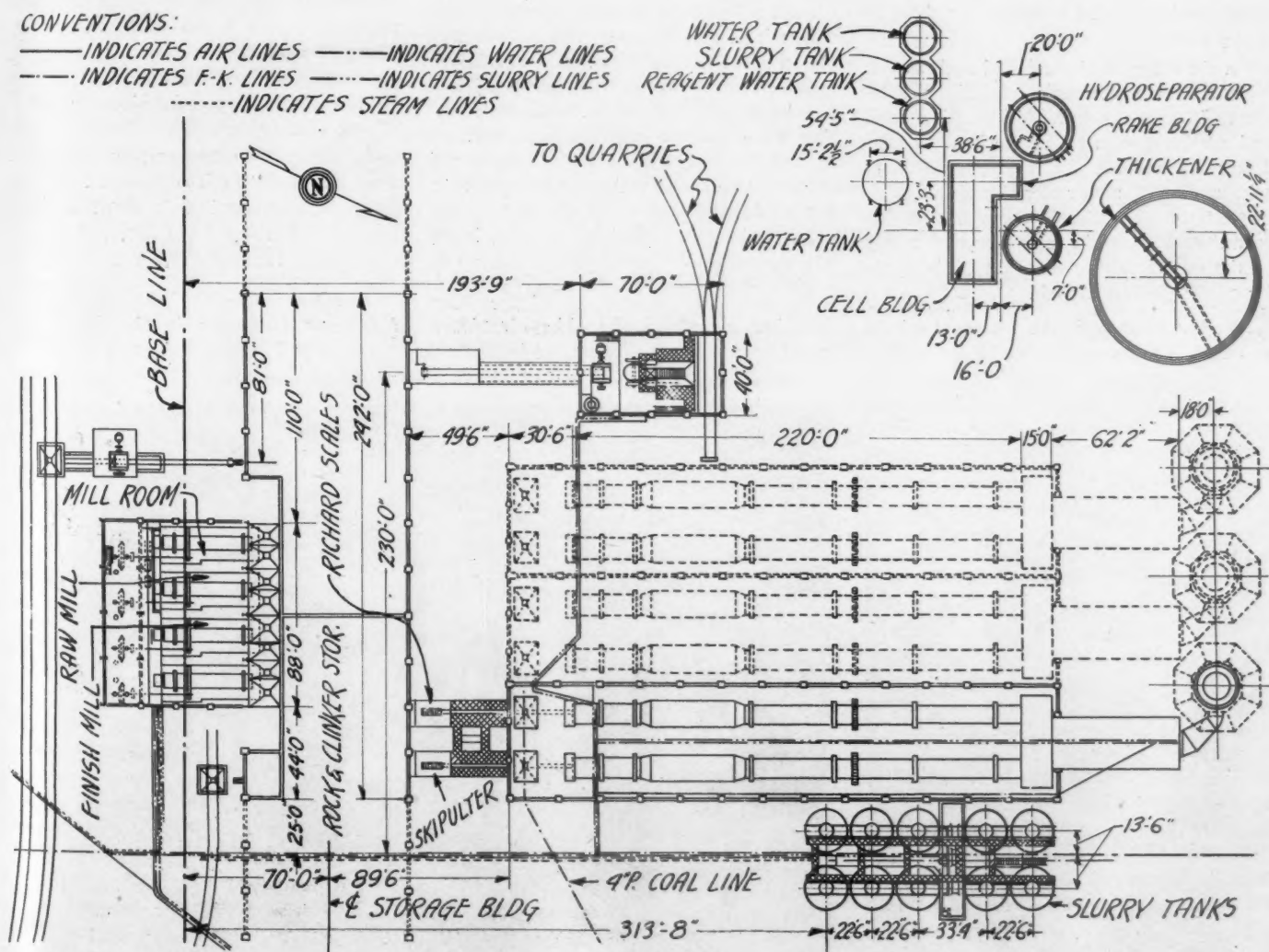
	Silica, Iron-Alumina Ratio
Cement "A"	1.84
Cement "B"	2.86
Cement "C"	2.48
Cement "D"	2.49
Cement "E"	1.90
Cement "F"	1.87

Separation and Recombination of Raw Materials

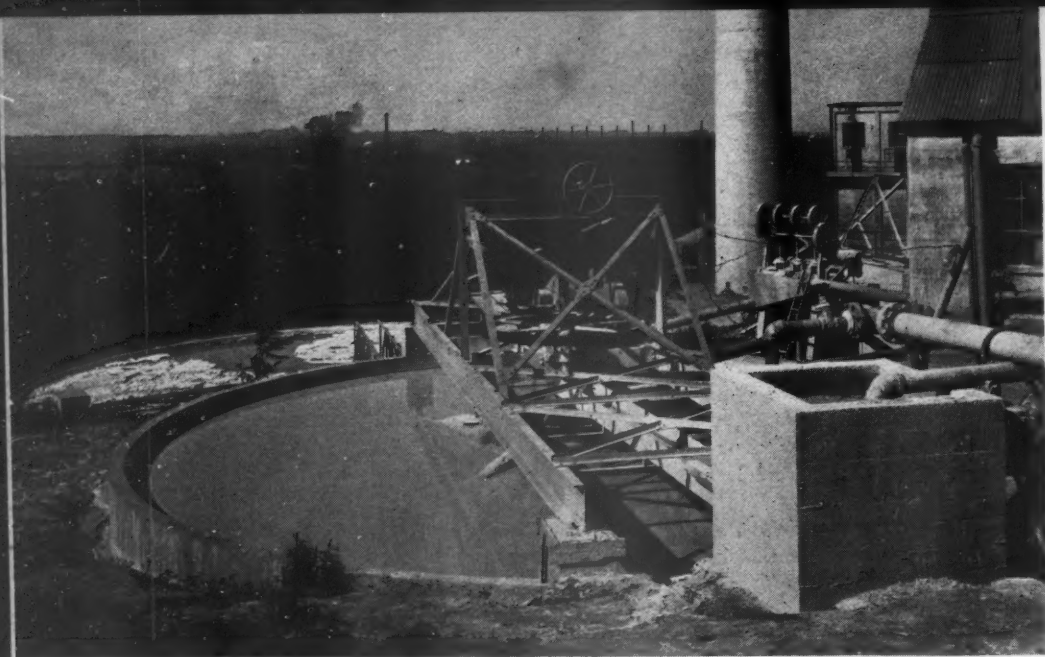
In experimentation to develop the methods of separating and recombining the mineral constituents, C. H. Breerwood, vice-presi-

dent, Valley Forge Cement Co., West Conshohocken, Penn., patentee of the process, discovered what is not generally known even by geologists—that the constituents of many sedimentary rocks used to make portland cement are not composed of chemically combined minerals, but are merely cemented particles of separate and distinct minerals. Hence, it was merely necessary to devise a method of crushing, or grinding, and a method of separation by flotation or otherwise, to disintegrate any such rock into particles of calcium carbonate; silica, including quartz and silicates of alumina; alumina, principally micaceous; iron oxides and sulphide; or some other combined form of these mineral elements.

The simplest example is perhaps the case of a natural cement rock which contains an excess of silica in the form of quartz grains. With proper grinding the hard quartz grains are largely freed from the calcium carbonate and alumina and can be removed in the subsequent flotation process. Such free quartz is not only hard to grind as a raw material, but often is a relatively coarse form of silica that is almost inert during the clinker-burning operation. Examination of clinker made with it has shown the quartz



Partial plant layout of Valley Forge Cement Co., showing location of new flotation units with respect to kilns and mill buildings



The hydro-separator (Valley Forge Cement Co. plant) showing junction box in which water is added to the slurry to increase the dilution to that necessary for separation in accordance with fineness

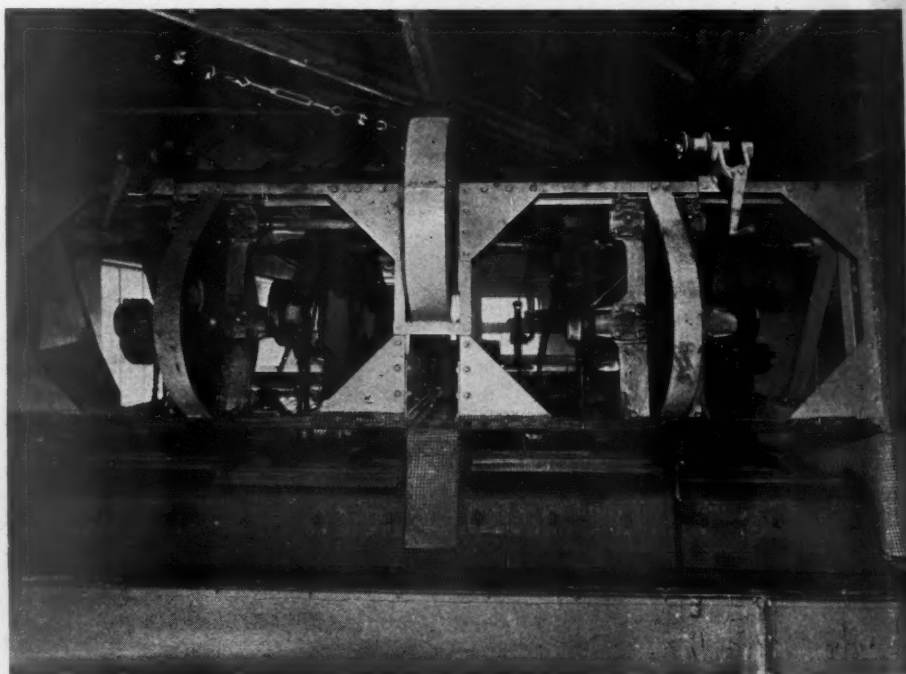
grains remain as quartz, uncombined with the lime. This clinker is very difficult to grind; and it throws the chemist off in his calculations of the proper proportions, or the proportions he believes he has, to enter into combinations with the lime. Consequently, it is economy to waste these coarse quartz grains, or find a market for them as a byproduct.

On the other hand a mineral such as fine mica, a silicate of alumina, contains the desired silica in a chemically reactive form and can be used to advantage in the manufacture of cement. It is thus possible to take a cement raw material and refine or concentrate the desirable minerals and discard the others, to the improvement not only of the manufacturing costs but of the quality of the product as well.

Another example is the treatment of the so-called inferior cement rocks or argillaceous limestones of the Lehigh Valley district, particularly those deficient in calcium carbonate, to derive from them an ultimate mixture of any desired composition without adding quantities of high-grade limestone. This is a common problem in the Lehigh Valley district, where many plants are faced with the necessity of importing limestone from considerable distances merely to raise the percentage of lime to that required for cement manufacture. Although Mr. Breerwood has found that probably all argillaceous limestones or cement rocks react favorably to the flotation step of the new process, whereby the calcium carbonate value can be raised to a desired proportion without correction by natural materials, it should be realized that the minor constituents may be corrected at the same time, whereas this does not necessarily follow when the correction is made by the addition of limestone from an outside source. Thus, the addition of high-grade limestone for the purpose of correcting an inferior cement rock fails to eliminate the uncombinable silica, especially the coarse quartz grains, and any change in the

silica, iron-alumina ratio is negligible. By the new method, however, the available stone may not only serve as the sole source of the final mixture, but each of the constituents may be controlled readily to correct all the proportions and ratios. Thus, the ability of the new method to control the alumina content and particularly with relation to iron values is of especial interest to manufacturers who are encountering difficulties in the manufacture of the newer cements of low tri-calcium aluminate value. For these reasons it has been the objective in the removal of undesirable quantities of both silica and alumina to eliminate the forms which do not combine readily, if at all, such as the coarse quartz grains and coarse mica, if the latter is present.

Discharge end of the rake classifier. The screw conveyor in the foreground receives the sands discharged by the rake elements and conveys them to the turbo-mixer in the Valley Forge plant



There is a practical significance in this for almost all cement manufacturers because it is common practice to quarry limestones in two or more strata separately, a low lime rock and a high lime rock, and to go through various steps in blending these to arrive at a satisfactory lime content. Often the two kinds of rock are found in different parts of a quarry, requiring an extensive operation with two, three or more shovels, where a single shovel could supply the requisite tonnage. By being able to concentrate the limestone to any required percentage of calcium carbonate, a plant may be supplied with rock from any part of the quarry by a single shovel.

It does not require much of an imagination to grasp the possibilities of making special cements, or portland cements with special characteristics, once the natural raw materials are separated into their principal mineral constituents.

Valley Forge Processing Plant

All that has gone before may be gleaned from the patent issued to Mr. Breerwood, and assigned to the Valley Forge Cement Co. But the thing that will interest the cement industry is not that these things *can* be done, but that they *are being* done on a commercial scale at the Valley Forge plant, where after several years of laboratory experimentation a complete minerals separation plant has been in operation since the first of March, treating the entire output of the tube mills. The accompanying plan shows how these new units fit into the plant as originally built (described in detail in *Rock Products*, October 29, 1927), and the accompanying views give an idea of the sim-

plicity of the new units for mineral separation.

Before describing the new equipment and its functions in detail, a brief review will be made of the reasons why the installation was made, which will make the commercial significance immediately apparent to all manufacturers confronted with raw material problems. Although the Valley Forge Cement Co. has never found it necessary to purchase limestone for the correction of its raw material composition, probably the most important accomplishment from a commercial point of view is that its rock deposit is now substantially inexhaustible. In other words, the new process has added at least 150,000,000 bbl. of mix to that already available for blending in conventional practice, with the result that it will never be necessary to import limestone. Secondly, quarry costs have been radically decreased, as the rock may be quarried without care in selection, and blending prior to grinding is unnecessary. This will be referred to in further detail, but one of the most interesting features of this development is that regardless of the variation in the calcium carbonate value of the rock as received for treatment, the final product of the separation plant is held exactly at the desired composition without correction. Third, there has been a very material gain in early and ultimate strengths of the cement, as was anticipated in view of the elimination of all quartz grains coarser than 325-mesh fineness, and the correction of the silica, iron-alumina ratio. In this connection it may be mentioned that the clinker is obviously of very high quality and thoroughly burned, the weight having increased about 16 lb. per cubic foot. Fourth, any known type of cement can now be made at will by controlling the recombination of the constituents segregated in the separation plant. Thus, the available materials can serve as the source for "low alumina," "high silica," "alkali resisting" and other types of cement. Fifth, and probably of the greatest impor-



Cell house in plant of Valley Forge Cement Co., showing turbo-mixer in the foreground. A pair of the oleic acid feeders is seen beside the speed reducer. The first group of four cells are the "roughers." The series of three cells in the background are the "cleaner" cells, and the two at the center are "recleaner" cells

tance, is the fact that the mill savings resulting from the use of the new process more than offset its cost, and these savings are in addition to the savings in the quarry itself.

The three major mill savings are, decreased raw and clinker grinding costs, and lower fuel consumption. For example, rock ranging from 68% to 75% calcium carbonate is ground to approximately 85% passing a 200-mesh sieve. As the excesses of silica and alumina are removed deliberately from the coarser products of the tube mill, the kiln feed ranges from 90% to 92% passing a 200-mesh sieve. Although the clinker is obviously better burned and appears harder there has been a saving of approximately 10% in fuel. The elimination of the uncombined quartz from the clinker has resulted in a saving of approximately 10% in grinding costs.

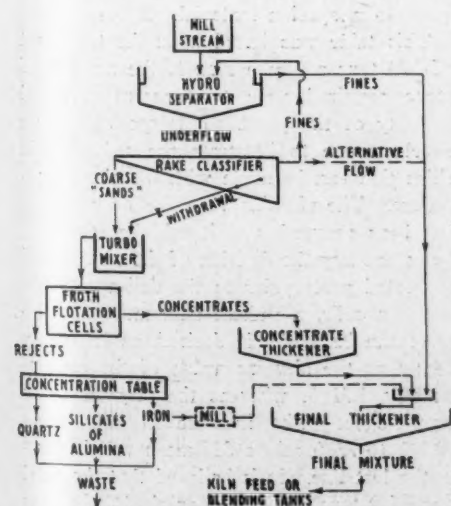
New Processing Units

The new units comprise three reinforced-concrete storage tanks 16 ft. inside diameter by 20 ft. high. One of these is for make-up water, one for tube-mill slurry and one for circulating water, which includes the un-used reagent; (2) a 30-ft. Dorr "Hydro-Separator"; (3) a Dorr Rake Classifier; (4) nine 44-in. flotation cells; (5) a 27-ft. Dorr "Thickener"; (6) an 80-ft. Dorr "Thickener."

Before referring to the actual flow diagram practiced at the Valley Forge plant, it should be pointed out that if desired, all of the tube mill products can be subjected to froth flotation to effect the separation

between the calcium carbonate and the argillaceous compounds. Ordinarily, however, this is not necessary or desirable as quantities of the fine constituents are essential to the final composition in substantially all cases. Accordingly, it is the practice at the

The four rougher cells, showing discharge of calcite-bearing froth into the pump hopper, from which it is conveyed to the calcite thickener. At the lower left, the froth from the recleaner cells will be seen entering the cement hopper. The gate shown in the center controls the underflow to the cleaner cells



Flow sheet of flotation plant of Valley Forge Cement Co.



Valley Forge plant to treat a variable quantity of the coarser particles separated from the mill stream, the quantity so treated varying inversely as the calcium carbonate varies in the stone as received. This makes it possible to remove the excess silica and alumina in a single operation, but as the silica is the constituent requiring the primary control, the separation of the original material into coarse and fine parts is based upon the excessive silica content of the raw material in this case. The following table will make this clear. This table is based upon the treatment of rock ranging from 68% to 75% calcium carbonate, ground to an average fineness of 85% passing a 200-mesh sieve, the treated quantities being that necessary to provide a final mixture of 75.8% calcium carbonate. The treated tonnage is based upon the present curtailed capacity of 700 tons a day.

CaCO ₃ in Rock	Percentage untreated	Percentage to be treated	Tons to be treated
68	46.5	53.5	374
69	49.0	51.0	356
70	52.7	47.3	331
71	56.6	43.4	304
72	60.2	39.8	272
73	65.7	34.3	239
74	71.0	29.0	203
75	77.3	22.7	159

Since the new separation plant was started it has been the practice to make the complete composition correction in the final thickener, but it has been intended to employ the slurry correction tanks when the rock received from the quarry will make it more economical or convenient to control the treatment to produce mixtures above or below ultimate composition.

Process Control

Referring to the flow diagram, it will be seen that the tube-mill slurry is delivered to a hydro-separator after sufficient water has been added to result in a dilution to approximately 20% dry solids. The hydro-separator serves as a 325-mesh sieve, the fines overflowing and being delivered directly to the final 80-ft. thickener. To complete recovery of the fines, the underflow is pumped to a rake classifier where the final separation and control of the treated and untreated parts is accomplished.

At the degree of fineness above described, the sands do not represent a sufficient tonnage for treatment to remove the excess silica. These sands, however, do include the the uncombinable sizes, which may be arbitrarily stated as coarser than 325-mesh. They are allowed to precipitate, and are recovered by the rake elements and delivered to a blunger or turbo-mixer. The necessary additional tonnage required for treatment is admitted through a perforated bleeder pipe extending across the rake box above the rake elements. This bleeder pipe serves as the control of tonnage, and actually the final analysis of materials combined in the thickener. The particles withdrawn by the bleeder are the coarser of the minus 325-mesh prod-

COMPLETE CORRECTION OF 700 TONS OF 72.2% CALCIUM CARBONATE ROCK						
	Mill stream	Hydro overflow	Cell feed	Concentrates	Rejects	Final mixture
Total tons	700.00	460.00	240.00	195.00	45.00	655.00
Total tons CaCO ₃	505.40	327.00	178.80	169.60	9.00	496.70
Tons SiO ₂	96.90	64.80	32.10	8.80	23.30	73.60
Tons Fe ₂ O ₃	11.60	7.03	4.57	3.33	1.24	10.36
Tons Al ₂ O ₃	37.38	25.90	11.48	3.43	8.05	29.30
Tons MgCO ₃	46.40	31.10	15.30	13.4	1.90	44.50
Grade (%) CaCO ₃	72.20	71.10	74.50	87.00	20.00	75.80
Grade (%) SiO ₂	13.84	14.09	13.38	4.50	51.80	11.25
Grade (%) Fe ₂ O ₃	1.66	1.53	1.90	1.71	2.74	1.58
Grade (%) Al ₂ O ₃	5.34	5.63	4.77	1.76	17.89	4.48
Grade (%) MgCO ₃	6.62	6.76	6.38	6.87	4.22	6.80
325-mesh fineness (%)	72.50	96.10	27.30	31.20	7.00	77.00

ucts, and the finer particles are allowed to overflow and are combined with the fines classified in the hydro-separator. To make the separation more accurate, the overflow from the rake classifier is returned to the hydro-separator, where it overflows to the thickener.

The collecting reagent, oleic acid, is added to the pulp discharged from the turbo-mixer, which is then fed to a group of four flotation cells. In these cells, known as the "rougher cells," the frothing agent, cresylic acid, is added, which, together with the aeration causes the calcium carbonate particles to be segregated from the argillaceous compounds and recovered with the froth. The underflow from these cells contains lime values, and is further treated in a series of three "cleaner cells." The froth discharged from these cells is of lower quality than that of the rougher cells, and it is likewise treated in a series of two "recleaner cells," the froth of which is combined with that of the rougher cells to form the final lime concentrate. This concentrate is delivered to a 27-ft. thickener. The underflow from the recleaner cells circulates through the three cleaner cells with the underflow from the rougher cells, the underflow of the last cleaner cell being the rejects or tailings of the plant.

In order to obtain capacity with economy, no attempt is made to obtain an absolutely pure concentrate, one of 87% calcium carbonate value being the most economical and convenient for the materials available at the plant. This concentrate is separately thickened, in order that the reagent water can be used continuously in circulation throughout the system to economize in reagents, and to effect a further economy in that the water is soft, as the calcium salts have been precipitated as calcium oleate. The underflow from this thickener is pumped by a Dorrco pump to a junction box, where this stream is continuously combined with the overflow from the hydro-separator, the two streams being de-watered to normal slurry moisture content in the 80-ft. thickener.

Although the tailings from the flotation cells do not now involve an uneconomical waste of any desirable constituents, it is the intention to install a wet concentration table for the purpose of recovering the iron values, principally sulphide, and to make the quartz suitable for sale as a byproduct.

It has been found that quartz, silicates of

alumina and iron are readily separable from these tailings by concentration, but the table is ineffective to make a separation between calcium carbonate and the argillaceous compounds. The proposed table is shown in the flow diagram. The iron values will either be returned to the tube mills for further reduction, or they will be ground separately in a small mill and added to the products entering the junction box of the thickener.

It has been found that the greatest total economy is particularly influenced by the degree of grinding of a specific argillaceous limestone, for instance. As carried out at the Valley Forge plant this means that the first consideration is to release the physical bonds between each of the constituents and to an extent that the final product will be of a desired ultimate fineness after the coarse particles of quartz and mica have been eliminated. Thereby, the concentrate can be held at a desired purity and the losses of calcium values in the rejects are negligible.

Since the separation plant was started in March of this year, the materials treated have ranged from 68 to 75% calcium carbonate. Regardless of this variation, however, the underflow from the 80-ft. thickener has been held to composition continuously, the error being so slight that blending has been entirely unnecessary. Due to the controls described above, the routine chemistry is actually simpler than that required in ordinary practice. The table at the top of this page shows just what happens to a specific material.

This table was based upon the treatment of 700 tons a day, which is the amount of stone required with the present curtailed capacity of the plant. This specimen is an excellent one to illustrate the reduction in silica that can be made with the above procedure. The alumina value, while not high, has been reduced, and it will be seen that by controlling the division of the treated and untreated parts prior to the delivery to the flotation cells, a radical elimination of alumina can be made, if desired, as it will be seen that the alumina value of the concentrate is 1.71%, whereas the original value was 5.34%. The increase in fines from 72.5% to 77% minus 325-mesh will be seen in the last line. It is believed that the total loss of 9 tons out of the original 505.4 tons of calcium carbonate does not warrant finer grinding than that practiced with this speci-

men, but laboratory work has shown that the products from the concentration table can be returned to the mills for further grinding and more complete recovery of the lime values if desired.

The separation plant is not elaborate, but has a capacity in excess of 1000 tons of stone a day. Approximately 48 additional man-hours are required for operation, and the installed motors total about 60 hp. The present total rejects for ranges in stone from 68% to 75% calcium carbonate vary from 95 to 24 tons.

The Valley Forge installation described and illustrated should be considered merely a specific application of the process. Naturally, different cement plants have different problems and the flow-sheet in each case would have to be adapted to the particular problem to be solved. Nor is the process confined to the application of the particular minerals separation equipment used in this instance. A dry process can be used and other types of separating and classifying machinery. Patents have been applied for covering such other variations of processing.

A substantially similar flow-sheet can be applied to dry process plants by the substi-

tution of air separation equipment for the hydraulic classifiers used at Valley Forge. In this case the air separator tailings would be treated by froth flotation, and the concentrates would be thickened to about 18% moisture content, and then dried and combined with the untreated fines from the separators.

A large number of rock specimens from various parts of the United States, as well as some foreign specimens, have been treated experimentally in the Valley Forge laboratory by means of a laboratory type flotation cell. The results obtained have made it appear clear that considerable savings in grinding costs can be made by employing different flow sheets. Thus, some of the samples can best be treated by inserting the new procedure in closed-circuit grinding, others by employing two-stage grinding, with the treatment between stages; and in others the treatment may be similar to that practiced at Valley Forge.

The author acknowledges with gratitude the assistance given by Mr. Breerwood in preparation of this article, which resulted from having followed developments at Valley Forge over a period of several years.

Code Developments

THE NRA has created an Industrial Appeals Board—a forum for a hearing of all sorts of complaints against the operations of codes but particularly those of small businesses that the codes oppress or discriminate against them or favor monopolies. The board will be charged with responsibility of hearing certain types of non-compliance cases and is expected to greatly stimulate code compliance. It will function in somewhat the same fashion as the recently abolished National Compliance Board, making recommendations for action by the administrator. In case of complaints by small businesses it may recommend the granting of relief by exemptions, exceptions or modifications and will be adequately equipped to insure prompt disposition of the complaints referred to it.

NRA on July 16 issued the following statement on "general policy":

NRA is endeavoring in the light of its experience to formulate general policies so that interested parties and the organization itself may know and work toward definite NRA aims.

This does not mean that every code in process and not approved at the time of announcement of a general policy must conform—in the sense of including the type of provision favored by policy. Under certain circumstances, it might be manifestly unfair to require substitution of a new clause after lengthy negotiations have finally resulted in assent by the industry to a supposed final form of the code. However, if a clause is so flatly inconsistent with policy as to require subsequent modification or elimination it is poor administration to first permit the clause to be included and then expend effort in changing it.

Change in codes designed to bring them

into conformity with policy will be required only to the following extent:

1. As to pending codes:

When in final form and assented to by the industry, before the date of announcement of a general policy, the code, if otherwise acceptable, will be approved. However, provisions flatly inconsistent with the essentials of such policy will be stayed, to the extent of such inconsistency, until the industry shows why such portions should not be permanently stayed or made to conform in substance to such policy.

2. As to approved codes:

- There will be no change so long as such a provision is causing no difficulty, but in such cases the Research and Planning Division and Deputies must observe operation;
- Whenever desired by the industry or whenever the occasion is appropriate changes will be effected;
- Whenever such observation reveals that such a provision in operation is troublesome administratively or is not operating in harmony with the purposes of the Act, the matter must be taken up with representatives of the industry and thereafter stayed unless a satisfactory modification can be effected with sufficient promptness.

Crushed Stone, Sand and Gravel, and Slag Industries: Approved the establishment of permissive areas in Colorado (two areas around Denver and Pueblo) and in the state of Missouri.

Approved, regional adjustment agency, for Region No. 1, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut: Paul P. Bird, Boston Sand & Gravel Co., Boston; Theodore C. Cooke, Lynn Sand & Stone Co., Swampscott, Mass.; A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.; Arthur S. Lane,

John S. Lane & Son, Inc., Meriden, Conn.; C. B. Dalton, Maine Sand & Gravel Co., Inc., Portland, Maine; S. N. Dunning, Atlas Sand & Gravel Co., Hartford, Conn.; J. H. McNamara, J. H. McNamara, Inc., Boston, Mass.

Approved regional adjustment agency for Region No. 6, Kentucky, North Carolina and Tennessee: H. E. Rodes, Franklin Limestone Co., Nashville, Tenn.; Thos. McCrosky, American Limestone Co., Knoxville, Tenn.; H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.; R. N. Coolidge, Cumberland River Sand Co., Nashville, Tenn.

Approved, regional adjustment agency for Region No. 12, Nebraska and Iowa: W. M. Stober, Western Sand & Gravel Co., Lincoln, Nebr.; R. C. Fletcher, Iowa Limestone Co., Des Moines, Iowa; H. E. Schellberg, Western Limestone Co., Omaha, Nebr.; C. E. Thomas, Des Moines, Iowa.

Ready-Mixed Concrete Industry: Approved, an amendment to code authorizing Code Authority to submit a budget and method of assessment upon which funds shall be contributed by members of the industry for the support of code administration.

Members of Code Authority approved: P. F. Ayer, Boston Sand and Gravel Co., Cambridge, Mass.; J. E. Burke, J. H. Davison and Brother, Pittsburgh, Penn.; J. E. Donelson, Sloss-Sheffield Steel and Iron Co., Birmingham, Ala.; A. C. Avril, Avril Tru Batch Concrete Co., Inc., Cincinnati, O.; J. L. Shiely, Guaranteed Concrete Co., St. Paul, Minn.; C. H. Makins, Makins Sand and Gravel Co., Oklahoma City, Okla.; R. E. Tremoureaux, Golden Gate Atlas Material Co., San Francisco, Cal.; H. F. Thomson, National Ready-Mixed Concrete Association, Inc., St. Louis, Mo., and Stanton Walker, National Ready-Mixed Concrete Association, Inc., Washington, D. C.

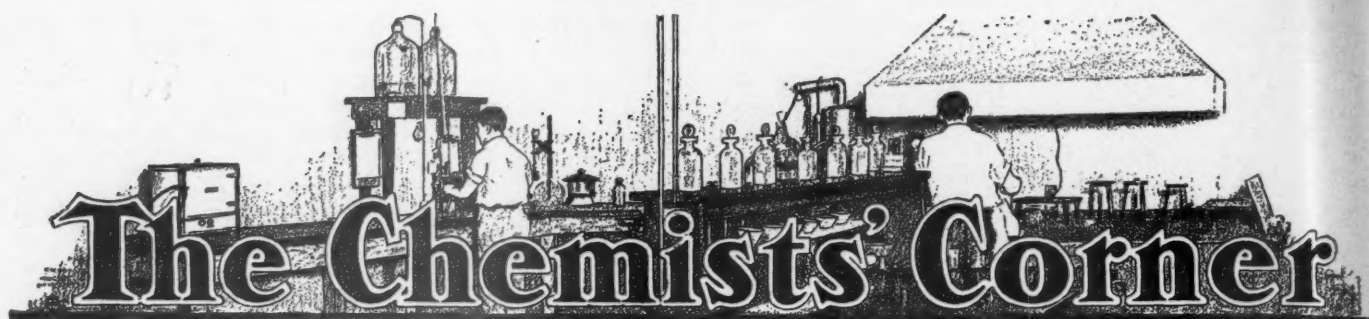
Application for termination as far as Code is concerned of the exemption in Paragraph III of Administrative Order X-36, dated May 26, 1934, which is that . . . "every member of a trade or industry is hereby exempted from an obligation to contribute to the expenses of administration of any code or codes other than the code of the trade or industry which embraces his principal line of business . . ." Hearing July 23.

Approved marketing areas:

Boston—Chairman, William Moore, J. P. O'Connell Co., Roxbury; J. H. McNamara, J. H. McNamara Co., Allston; A. I. Merigold, the Whittemore Co., Roxbury; Paul B. Bird, Boston Sand and Gravel Co., Cambridge; C. H. Latham, Lynn Sand and Stone So., Swampscott; and Setrak Derdarian, Watertown Builders and Supply Co., Watertown.

Pittsburgh—J. E. Burke, J. K. Davison and Brother, Pittsburgh; P. M. Moore, Ali-

(Concluded on page 61)



Apparatus to Determine Linear Expansion of Concrete Bars Due to Temperature Changes

By S. L. Meyers,

Southwestern Portland Cement Co., El Paso, Tex.

CERTAIN PROPERTIES of concrete are recognized which, for greater permanence of concrete structures, need to be minimized or overcome. Some of these properties are:

(1) Volume changes due to moisture changes:

- (a) Increase of bulk with absorption of moisture.
- (b) Decrease of bulk with loss of moisture.

(2) Volume changes due to temperature changes:

- (a) Increase of size with higher temperatures.
- (b) Decrease of size with lower temperatures.
- (3) Change of form due to plastic flow; the movement of a concrete mass to relieve a stressed condition.

The above three properties are inherent and always present in concrete.

Other causes of concrete disintegration of a more local nature are: frost, alkali, or chemical replacement; unsound aggregates and corrosion of steel reinforcements.

These latter conditions can nearly always be successfully overcome in the design of a concrete structure, but volume changes have not received the attention their importance deserved, so that at present only the grossest violations of low volume change principles are avoided—with the result that concrete has not risen to its fullest heights, either as a non-varying building material, or as an unaided means of esthetic architectural expression.

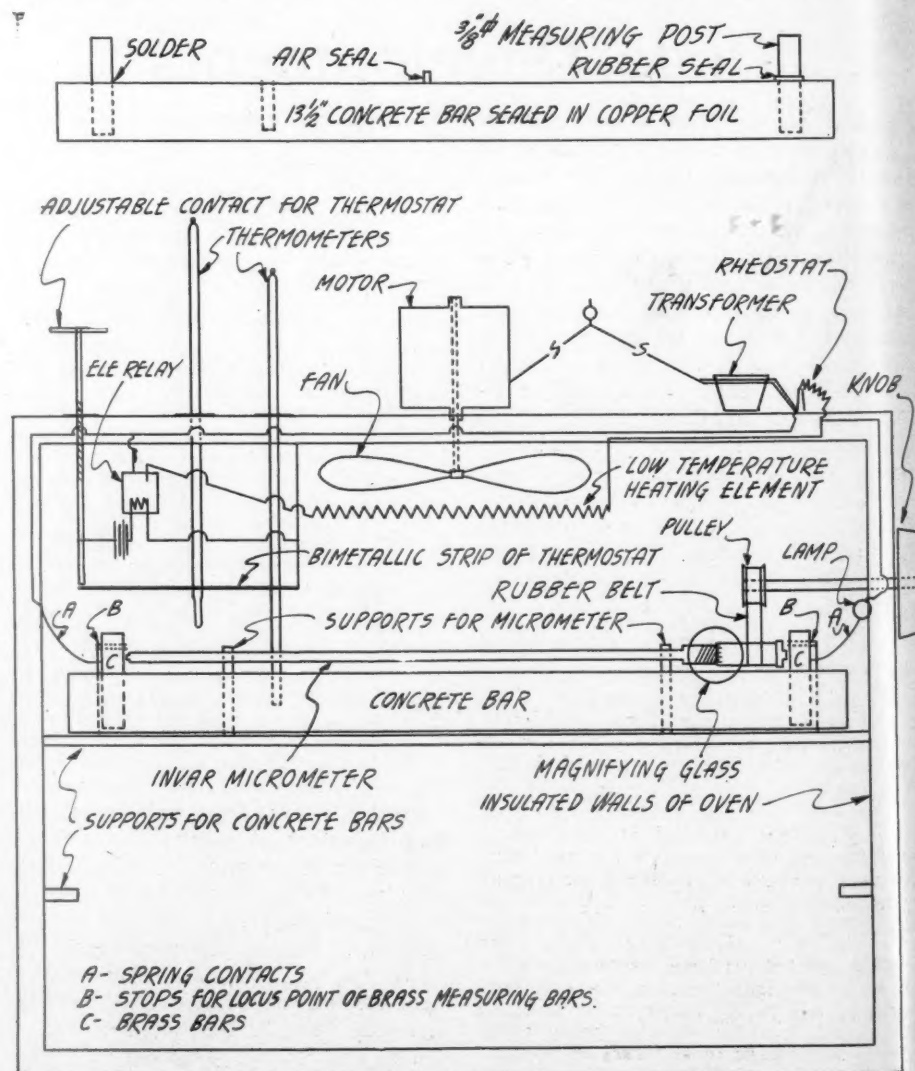
Designers and engineers have been handicapped by a lack of extensive information relating to conditions causing volume change in concrete; this is particularly true of thermal volume changes, and here investigations appear to be held back by the lack of a common adequate instrument for measuring thermal volume changes, which will not itself be affected to a great extent by temperature changes.

The accompanying sketch shows a reason-

ably simple apparatus for rapidly measuring the thermal expansion of neat cement or concrete bars.

At the top of the drawing is a concrete bar ready for test. Near each end of the bar are cast vertical square brass posts, their

inner surfaces parallel and highly polished to minimize inequalities of surface. The inner faces of the brass posts are 12 in. apart. An Invar micrometer measures change of length between these two brass faces. For a test to be of value there should be no moisture



Above: Concrete test bar. Below: Apparatus for measuring thermal expansion of neat cement or concrete bars.

changes within the concrete bar, while it is being tested for thermal expansion, since moisture changes are reflected in volume changes independent of heat changes. As we are dealing with a small specimen, with a relatively large surface area, the length changes due to moisture changes would be of first importance if not controlled.

Many different substances such as paints, varnishes, rubber compounds and waxes were tried, but all failed to completely stop moisture losses; so recourse was had to metal containers. The container had to be airtight and sufficiently flexible not to restrain the movement of the concrete. Copper foil 0.0012 in. was found to be satisfactory for these conditions.

To get the true temperature of the bar, a copper well is cast in the concrete bar and sealed to the foil with solder. Mercury is used in the well to facilitate temperature readings. An air seal is used to test the copper foil for air leaks, the air seal outlet is soldered over at other times.

Use of Apparatus

For testing the concrete or neat cement bar is placed in the heating cabinet so that the brass posts (4) are always held in an identical position by the stops (16), and the contact points of the micrometer (5) always contact the same place on the brass measuring faces of (4). Next the knob (8) is turned until the micrometer, which is free to slide horizontally through the supports (17), contacts the measuring posts and completes the electric circuit and lights the lamp (23). A rubber gasket sealed at one post prevents shorting through copper foil. The micrometer reading is read through the magnifying glass (19) at the point where the least extension lights the lamp, reading the micrometer to the nearest 0.0001 in.

To raise the temperature of the bar, the glass door of the cabinet (not shown) is closed, the thermostat (14) set at desired temperature, and the fan turned on. When the desired temperature is reached, the bar is measured as before, the difference in micrometer readings is due to thermal expansion. The coefficient of thermal expansion is:

$$\left(\frac{\text{difference in micrometer readings}}{\text{difference in temperature} \times 12} \right) \text{ plus } 0.000006$$

The micrometer used was made from Invar, an alloy of nickel and steel. When the nickel content approaches 36% of the alloy the coefficient becomes very small. The alloy was named Invar because it was considered invariable during temperature changes; actually it does have a measurable coefficient of expansion which increases with the temperature. For the temperature range used in testing hydrated cements, 0.000006 is about the right correction to use for the expansion of the micrometer.

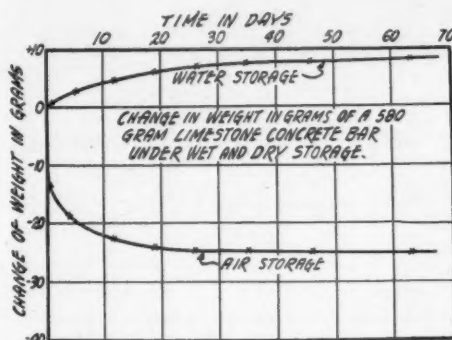
Results of Tests

All neat portland cements tested with this apparatus showed a greater coefficient of thermal expansion than any concrete made

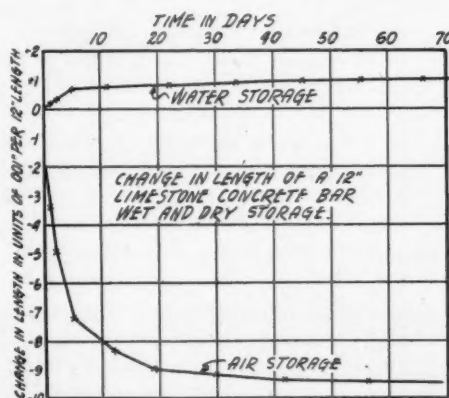
with common aggregate; it follows that the leaner the mix, the less expansion and contraction will occur due to temperature changes. The following coefficient results illustrate this:

Neat cement.....	0.0000097 per deg. F.
1 : 1 mortar.....	0.0000078 per deg. F.
1 : 3 mortar.....	0.0000065 per deg. F.
1 : 6 mortar.....	0.0000060 per deg. F.

Since different aggregates have different expansive capacities due to heat changes, the kind of aggregate used will affect the thermal expansion of the concrete; as the following tests on concrete bars, made from



Graphs showing change in weight (above) and in length (below) of concrete bars in air and water storage.



graded aggregates—1 : 4 : 7 mix with a constant consistency—indicates:

Limestone	0.0000050 per deg. F.
Dolomite	0.0000062 per deg. F.
Granite	0.0000051 per deg. F.
Flint	0.0000077 per deg. F.
Sand	0.0000063 per deg. F.
Cinders	0.0000043 per deg. F.

At present tests are underway to determine the effect of chemical composition of cement on its thermal coefficient, also the effect of different degrees of burning clinker, and the effect of different ways of cooling clinker.

Recently a new type of cement has been developed having a low heat of hydration, so that the internal temperature of the mass of concrete in which this type of cement is used will not be as great as where ordinary portland cement is used; here a cement having both a low heat of hydration and a low coefficient of thermal expansion would be desirable.

A graph showing change of weight and length of concrete bars, having no protective covering and stored in both dry air and under water, is given to point out the necessity of an air-sealed cover for the bars to eliminate moisture changes while under test. It will be noted that change in weight closely parallels change of length. If a record of the bar weights is kept, then a change of weight at once indicates a leak in the copper foil covering or at the rubber gasket connection.

This apparatus can also be used for measuring changes of length due to moisture changes if the test bar is left uncovered and the measurement always made while the bar is at the same temperature, to eliminate changes of volume due to temperature.

Very little investigation has been done on the subject of thermal expansion of cements and concretes, and there appear to be many factors, both chemical and physical, entering into the manufacture of the cement and the fabrication of the concrete, which affect this property; work along this line should make for a more truly permanent structural material.

The apparatus described here is the writer's first attempt at constructing an instrument for this kind of test and those more familiar with the technique of exact and delicate instruments will no doubt see many points for improvement.

New Lime Process Patent Used

AN ITALIAN patent by Prof. F. Ferrari has been applied to the manufacture of "adhesive lime," described as lime slaked with acid or saline solutions. Among the many chemical agents used, hydrochloric acid has given the best results in the cases of lime for walling; fat (from ordinary stone), slightly and averagely hydraulic; very hydraulic. For plaster: Fat (as before), slightly hydraulic. For finishing: Fat as before. Whitewashing: Fat (from very pure stone of very fine structure). The patented Pozzi adhesive lime is employed in much the same way as usual, but the gauging varies, and are more profitable as shown: For walls (ordinary granular composition). Lime and sand: Fat, 1:9 to 1:12. Hydraulic, 1:6 to 1:10. For plaster, 1:6 to 1:8. For finishing, 1:5 to 1:6. Mixed with 70 to 75% pozzolana, in dust and hydrated: Fat lime, 1:4 to 1:5. Prof. Ferrari describes adhesive lime as made with hydrated quick lime, fat or hydraulic, in presence of special catalysts; remarkable for its extremely divided state; the form of its elements highly favorable to adhesion through the absence of all expansion. The result is that it can give, with half the quantity employed for ordinary lime, exceedingly plastic mortars, very adhesive and perfectly stable in volume, hardening quickly, and with high mechanical resistance.



Hints and Helps for Superintendents

Belt Conveyor vs. Skips

ALL OF THE OPERATORS in the soft limeroak producing sections of the South Atlantic States use skips for hoisting the material to the crushing plant. The crushers, usually of the slugger roll type and two in number, are set at sufficient height to discharge direct to cars. However, the Southern Limeroak Co. plant near Cordel, Ga., has placed its crushing unit, a Williams hammer mill, on the quarry floor



Hopper-fed pan conveyor

and only elevates the crushed material sufficiently high to dump into a standard-gauge gondola. Here a belt conveyor serves the loading apron.

In the illustration the hopper in the foreground feeds a pan conveyor that in turn feeds the hammer mill. The belt conveyor runs in the inclined gallery to the loading chute.

Cool Office for Hot Climates

AT THE REYBURN AVE. plant near Roscoe, Calif., now owned by Graham Brothers, Inc., the office is a low ceilinged structure, and as the district is favored with hot weather once in a while, the office used to become unbearable, so the old principal of a "fly," or sub-roof, over the main structure was resorted to and the temperatures within the office were lowered to a very comfortable figure.

There is nothing complicated or involved

in the design. The secondary roof is simply built over the lower structure so that air can circulate freely between the two roofs. This amounts then to the office always being in the shade.

When, during the summer, your foreman's office becomes too torrid, try this simple solution and be comfortable.

Quick Method of Determining Amount of Slurry

THE Davenport, Ia., plant of the Dewey Portland Cement Co. uses Oliver-United slurry filters; and a quick method was developed to determine the amount of filter cake fed to the kilns. A table with scales, chart and "cookie cutter" is placed in the filter room, as shown. The "cookie cutter" closely resembles the common kitchen utensil except it is of brass and has a carefully calibrated diameter. It is used to take out a circular disk, or "cookie," or "pancake," of the dewatered slurry just before it is removed from the filter disks. This pancake of slurry is accurately weighed and from a chart compiled for the purpose an estimate of the amount of slurry going to the kilns may be readily made. The average of weight of the pancakes from the filter units feeding a kiln is of course what is used in reading the chart.

The scheme of operation at this plant is to direct the feeding of so much raw material to the kiln, and the kiln burners are instructed to burn this to clinker. The kiln burners are not permitted to vary the feed from time to time to suit varying burning

conditions, but are expected to supply burning conditions to take care of the material supplied them, and the chief object of the method described, for determining the amount of raw material fed, is to see that kilns get their full quota. This scheme of



Scales, chart, cutter, etc., for determining slurry volume

control eliminates trouble and simplifies the burning operation and makes for uniformity of product because of the elimination of variables. Natural gas is used for burning, which possibly makes burning conditions more uniform than might otherwise be the case.



Double roof for sunbeaten plant office

Recovering Broken Drill Steel— Cleaning Holes

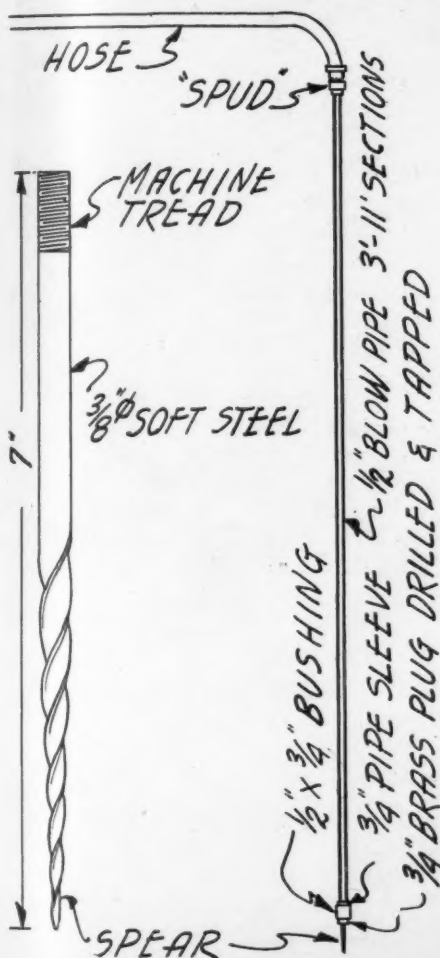
By John F. Robertson

Cedar Bluff Quarry, Princeton, Ky.

WE are using an Ingersoll-Rand X-71 wagon drill for drilling a 32-ft face. Two attachments of our own design are illustrated in the accompanying sketch.

At the end of each shift, the operator removes his bit, no matter what the depth of the hole, and plugs the hole with cotton waste. The next morning he uses the blowpipe to clean out any damp cuttings. We have found that many delays have been eliminated by this simple operation.

The "spear" has been worth many times



Blowpipe (right) for deep wagon drill holes. Left: Spear device for removing broken bits. Lower end is squared up to a point with a long taper on anvil; it then is heated and the point twisted in the vise, thus producing an end similar to an ordinary "easy-out"

the little trouble it takes to make. Often a short piece of drill steel breaks off the end of the bit. From 2-ft. lengths on down, it is almost impossible for the steam shovel men to find them in the rock pile after shooting. In nine cases out of ten, the "spear" will quickly find the hole in the steel, and it is usually an easy matter to lift the piece of bit out. The drill hole is then ready for another bit.

In using the spear the man must first blow



Timber and rail protection for crusher

the accumulated dust from the broken piece of steel. Next he must "fish" a while until he finds the hole with the sharp point. Finally he turns the pipe with a pipe wrench and at the same time taps with a heavy wooden block on the top of the pipe. This sets the spear tightly in the hole in the broken bit. A good steady lift on the pipe usually brings the bit out. It is surprising to find how hard one must pull to loosen the spear once it is set in the bit, and unless the bit is very long or tightly stuck in the hole, the removal is easily accomplished. For lengths of 2 ft. and over, we usually leave the bit in the hole.

Protecting the Primary Crusher

WHEN quarry stone is dumped to the primary gyratory crusher from a little height above the crusher head, the impact on the spider and head is quite considerable and occasionally will crack one or the other of the parts. To prevent this, the Watauga Stone Co., of Watauga, Tenn., bolted an 8 x 8 in. timber from the head down to the platform on the side on which

the stone was dumped. To prevent excessive wear on this timber, a pair of railroad rails were clamped on top of it. The protection has worked very well.

Inexpensive Track Switch

A QUARRY switch which does not require an expensive frog is illustrated in the accompanying picture. A single rail is pivoted at the point where the two tracks come together, but has its other end free to swing from one outside rail to the other.

In changing the switch, this rail is moved all the way across the track by hand. The two outside rails must be somewhat bent, right at the point of contact or the gauge of the track at that particular point will be too wide. The end of the swinging rail must also be pivoted to permit the cars to move across the point smoothly. An iron bar laid on the tie beneath the end of the swinging rail aids in sliding it back and forth and gives a firm seat for it. The pivoting can be done by the use of loosely bolted fishplates.



Pivoting rail for quarry switch

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividend	Stock	Date	Bid	Asked	Dividend
Allentown P. C., com. ⁴⁷	6-26-34	4½	5½		Material Service Corp. ⁴⁷	6-26-34	3	5	
Allentown P. C., pfd. ⁴⁷	6-26-34	5	6½		McCready-Rodgers, com. ⁴⁷	6-26-34	7	10	
Alpha P. C., com.	7-26-34	12½	15		McCready-Rodgers, 7% pfd. ⁴⁷	6-26-34	45	50	
Alpha P. C., pfd. ⁴⁷	6-26-34	85	90	\$1.75 qu. June 15, 1934	Medusa P. C., com.	7-24-34	6	11	
Amalgamated Phos. 6's, 1936 ⁴⁷	6-26-34	97	100		Medusa P. C., pfd. ⁴⁷	6-26-34	35	40	
American Aggregates, com. ⁴⁸	7-15-34	¾	1¼		Michigan L. and C., com. ⁴⁷	6-26-34	60	65	
American Aggregates, pfd. ⁴⁸	7-15-34	5	15		Missouri P. O.	7-26-34	6	.....
American Aggregates, 6's 1st mtg. 3/8's, 1943 new bonds ⁴⁸	7-15-34	40	45		Monarch Cement, com. ⁴⁷	6-26-34	90	100	2% July 5, 1934
American Aggregates, 6's 1943, old bonds ⁴⁸	7-15-34	60F	70F		Monolith P. C., com. ⁴⁷	7-13-34	2	2½	
American L. & S., 1st 7's ⁴⁸	7-15-34	76	.....		Monolith P. C., 8% pfd. ⁴⁷	7-13-34	4¾	5	25c June 10, 1934
Arundel Corp., com. ⁴⁸	7-15-34	13	15	25c qu. July 2, 1934	Monolith P. C., units ⁴⁷	6-26-34	13	15	
					Monolith P. C., 1st Mtg. 6's ⁴⁷	7-13-34	85	90	
					Monolith Portland, Midwest, pfd. ⁰	7-13-34	¼	½	
Bessemer L. and C., Class A ⁴⁸	7-15-34	2½	3½		National Cem. (Can.) 1st 7's ⁴⁸	7-15-34	80	.....
Bessemer L. and C., 1st 6½'s, 1947 ⁴⁸	7-15-34	25F	.....		National Gypsum A., com.	6-25-34	9¾	10¼	
Bessemer L. and C., cert. of dep., 1947 ⁴⁸	7-21-34	28	.....		National Gypsum, pfd.	7-26-34	86	88	\$1.75 qu. July 2, 1934
Bloomington Limestone, 6's ⁴⁷	6-26-34	9	11		National Gypsum 6's	7-21-34	90	.....
Boston S. and G., new com. ⁴⁷	7-15-34	1	2		National L. and S. 6½'s, 1941 ⁴⁷	6-26-34	80	85	
Boston S. and G., new 7% pfd. ⁴⁷	7-15-34	5	10		Nazareth Cement, com. ⁴⁷	6-26-34	4	7	
Boston S. and G., 7's, 1934 ⁴⁷	7-15-34	60	.....		Nazareth Cement, pfd. ⁴⁷	6-26-34	25	30	
					Newaygo P. C. 1st 6½'s, 1938 ⁴⁶	7-21-34	50	.....
California Art Tile, A ⁰	7-13-34	1	2½		New England Lime 6's, 1925 ⁴⁴	6-17-34	10	15	
California Art Tile, B ⁰	7-13-34	no bid	.....		N. Y. Trap Rock 1st 6's, 1946 ⁴⁷	7-19-34	56	actual sale	
Calaveras Cement, com.	7-21-34	¾	1½		N. Y. Trap Rock, 7% pfd. ⁴⁶	7-21-34	60	Subject	
Calaveras Cement, 7% pfd.	4-12-34	47½	75	\$1.75 qu. Jan. 15, 1934	North Amer. Cement, 1st 6½'s ⁴⁷	6-26-34	20	25	
Canada Cement, com.	7-20-34	6½	actual sale		North Amer. Cement, com.	7-20-34	5	.....
Canada Cement, pfd.	7-20-34	40	actual sale		North Amer. Cement, 7% pfd.	7-20-34	19	2½	
Canada Cement, 5½'s, 1947 ⁴⁷	7-17-34	74	96		North Shore Mat. 1st 6's ⁴⁷	6-26-34	50	55	
Canada Crushed Stone, bonds ⁴⁸	7-15-34	76	.....		Northwestern States P. C.	7-26-34	13½	14½	\$1.50 Jan. 2, 1934
Canada Crushed Stone, com. ⁴²	7-15-34	10	nominal		Northwestern Port. Cem., units ⁹	5-15-34	37	40	1% on pfd. stk. July 1, 1934
Certainite Products, com.	7-26-34	4¾	4½						
Certainite Products, pfd.	7-26-34	20	32		Ohio River S. and G., com.	7-22-34	.....	5	
Certainite Products, 5½'s, 1948	7-26-34	61	actual sale		Ohio River S. and G., 1st pfd.	7-23-34	28½	.....
Cleveland Quarries	7-24-34	5	.....		Ohio River S. and G., 2nd pfd.	7-23-34	5	10	
Consol. Cement, 1st 6½'s, 1941 ⁴⁷	6-26-34	20	22		Ohio River S. and G., 6's ⁴⁸	7-21-34	10	.....
Consol. Cement, pfd. ⁴⁷	6-26-34	1	2		Oregon P. C., com. ⁴⁷	6-26-34	5	10	
Consol. Oka S. and G. (Can.), 6½'s ⁴⁸	6-23-34	22	25	nominal	Oregon P. C., pfd. ⁴⁷	6-26-34	40	50	
Consol. Rock Prod., com. ⁴⁷	6-26-34	½	1						
Consol. Rock Prod., pfd. ⁴⁷	6-26-34	1	2		Pacific Coast Aggr., com. ⁴⁰	7-10-34	.....	10c	
Consol. Rock Prod., units ⁴⁷	6-26-34	2	3		Pacific Coast Aggr., pfd. ⁴⁰	7-10-34	.....	15c	
Construction Mat., com. ⁴⁷	6-26-34	1	2		Pacific Coast Aggr., 6½'s, 1944 ⁴⁰	7-10-34	16	17½F	
Construction Mat., pfd. ⁴⁷	6-26-34	2	4		Pacific Coast Aggr., 7's, 1939 ⁴⁰	7-10-34	2	3F	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948 ⁴⁷	6-26-34	28	32		Pacific Coast Cement 6's, 1937 ⁴⁰	7-10-34	45	47½	
Coosa P. C., 1st 6's ⁴⁷	6-26-34	10	20		Pacific P. C., com. ⁴⁰	7-10-34	4¼	5¼	
Coplay Cement Mfg., pfd. ⁴⁷	6-26-34	6	8		Pacific P. C., pfd. ⁴⁰	7-10-34	34	38	
Coplay Cement Mfg., 6's, 1941 ⁴⁷	6-26-34	45	50		Pacific P. C. 6's, 1931 ⁴⁰	7-10-34	90	.....
					Pacific P. C. 6½'s, pfd.	6-18-34	34	38	
Dewey P. C., com. ⁴⁷	6-26-34	70	80		Peerless Cement, com. ⁴⁷	6-26-34	.....	½	
Dolese and Shepard	7-26-34	10½	11½		Peerless Cement, pfd. ⁴⁷	6-26-34	1	2	
Dufferin Pav. and Cr. Stone, com.	7-16-34	2	actual sale		Penn.-Dixie Cement, com.	7-26-34	3¼	4	
Dufferin Pav. and Cr. Stone, pfd.	7-16-34	30	actual sale		Penn.-Dixie Cement, pfd.	7-26-34	14	19	
					Penn.-Dixie Cement, 6's A, 1941	7-26-34	72	actual sale	
Edison P. C., com. ⁴⁷	6-26-34	1	2		Penn. Glass Sand Corp., pfd. ⁴⁷	6-26-34	70	75	\$1.75 July 1, 1934
Edison P. C., pfd. ⁴⁷	6-26-34	2	4		Penn. Glass Sand Corp., 6's ⁴⁷	6-26-34	97	100	
					Petoskey P. C., 6's, 1941 ⁴⁸	7-15-34	45	.....
Federal P. C., 6½'s, 1941 ⁴⁷	6-26-34	30	32		Petoskey P. C., 6's, 1935-1938 ⁴⁸	7-15-34	50	.....
Florida Port. Cement 6½'s, '37.	7-21-34	80	84		Petoskey P. C., 6's	7-15-34	2¼	4	
Florida Port. Cement units ⁴⁷	6-26-34	6	7½		Port Stockton Cem., com. ⁹	7-13-34	no market	.....
Giant P. C., com. ⁴⁷	6-26-34	2	4		Republic P. C., 6's, 1943 ⁴⁷	6-26-34	65	70	
Giant P. C., pfd. ⁴⁷	6-26-34	14	17		Riverside Cement, A ⁰	7-13-34	5	7½	20c Aug. 1, 1934
Gyp. Lime & Alabastine, Ltd.	7-20-34	6	actual sale		Riverside Cement, B ⁰	7-13-34	1	2	
Gyp. Lime & Alabastine 5½'s, 1948	7-17-34	74½	80		Riverside Cement, pfd. ⁰	7-13-34	80	83	\$1.50 qu. Aug. 1, 1934
					Rockland and Rockport Lime, 1st pfd. ⁴⁷	6-26-34	2	3	
Hermitage Cement, com. ⁴⁷	6-26-34	5	10						
Hermitage Cement, pfd. ⁴⁷	6-26-34	35	40		Sandusky Cement 6's ⁴⁷	6-26-34	55	65	
					Sandusky Cement 6½'s, 1932-37 ⁴⁷	6-26-34	55	65	
Ideal Cement 5's, 1943 ⁴⁷	6-26-34	100	102		Santa Cruz P. C., com. ⁹	7-13-34	49	53	\$1.00 qu. July 1, 1934
Ideal Cement, com.	7-26-34	36	39	25c qu. July 1, 1934	Schumacher Wallboard, com. ⁹	7-13-34	1	2½	
Indiana Limestone 6's	6-26-34	12	15		Schumacher Wallboard, pfd. ⁹	7-13-34	.....	5	
International Cem. bonds, 5's, 1948	7-26-34	99½	actual sale		Signal Mt. P. C., com. ⁴⁷	6-26-34	1½	3	
International Cement, com.	7-26-34	21½	22		Signal Mt. P. C., pfd. ⁴⁷	6-26-34	14	18	
					Signal Mt. P. C., 6's, 1936 ⁴⁰	7-21-34	89	.....
Kelley Island L. and T.	7-26-34	10	11	15c qu. July 1, 1934	Southwestern P. C., units ⁴⁰	7-10-34	150	.....
Ky. Cons. Stone, 6½'s, 1933.	5-26-34	5	6		Standard Paving & Mat. (Can.) com.	7-16-34	1½	actual sale	
Ky. Cons. Stone, com. ⁴⁷	6-26-34	1	2		Standard Paving & Mat. pfd.	7-16-34	19	actual sale	
Ky. Cons. Stone, pfd. ⁴⁷	6-26-34	3	5		Superior P. C., A ⁴⁰	7-10-34	24	27	55c July 1, 1934
Ky. Cons. Stone, 7% pfd. ⁴⁷	6-26-34	3	5		Superior P. C., B ⁴⁰	7-10-34	4¾	5½	
Ky. Cons. Stone, 1st Mtg. 6½'s	7-23-34	5	6						
Ky. Cons. St. V. T. C. ⁴⁶	7-21-34	no market	.....		Trinity P. C., units ⁴⁷	6-26-34	22	27	
Ky. Rock Asphalt, com.	7-23-34	90c	.....		Trinity P. C., com. ⁴⁷	6-26-34	2	5	
Ky. Rock Asphalt, pfd.	7-23-34	6	8		Trinity P. C., pfd. ⁴⁷	6-26-34	20	25	
Ky. Rock Asphalt 6½'s, 1935.	7-23-34	.....	55						
Kentucky Stone, com. ⁴⁷	6-26-34	.....	½		U. S. Gypsum, com.	7-26-34	41½	43	25c qu. July 2, 1934
Kentucky Stone, pfd. ⁴⁷	6-26-34	.....	5		U. S. Gypsum, pfd.	7-26-34	140	145	\$1.75 qu. July 2, 1934
Lawrence P. C.	7-26-34	9	11		Wabash P. C. ⁴⁷	6-26-34	7½	10	
Lawrence P. C., 5½'s, 1942 ⁴⁷	6-26-34	71	74		Warner Co., ww., 1st 6's	7-20-34	29½	38½	
Lehigh P. C., com.	7-19-34	14½	15		Warner Co., ex.w. 1st 6's ⁴⁷	6-26-34	25	35	
Lehigh P. C., pfd.	7-26-34	74½	80	87½c qu. July 2, 1934	Warner Co. com. (sold at auction, Philadelphia)	3-7-34	2½	actual sale	
Louisville Cement ⁴⁷	6-26-34	70	75		Warner Co. pfd. (sold at auction, Philadelphia)	3-7-34	7½	actual sale	
Lyman-Richey 1st 6's, 1935 ⁴⁷	6-26-34	95	100		Whitehall Cem. Mfg., com. ⁴⁷	6-26-34	30	35	
					Whitehall Cem. Mfg., pfd. ⁴⁷	6-26-34	50	55	
Marbelite Corp., com. cement (pts.) ⁴⁰	7-10-34	8c	¾		Wisconsin L. & C., 1st 6's, '33 ⁴⁷	6-26-34	95	100	
Marbelite Corp., pfd. ⁴⁰	7-10-34	60c	1¼		Wisconsin L. & C., 6½'s ⁴⁷	6-26-34	95	100	
Marblehead Lime 6's, 1939.	7-21-34	27	32		Wolverine P. C., com. ⁴⁰	7-10-34	.....	.....
Marquette Cement, com. ⁴⁷	6-26-34	14	16						
Marquette Cement, pfd. ⁴⁷	6-26-34	50	55		Yosemite P. C., A, com. ⁴⁶	7-21-34	1½	.....
Marquette Cem. Mfg. 1st 5's, 1936 ⁴⁷	6-26-34	80	90						
Marquette Cem. Mfg. 1st 6's, 1935 ⁴⁸	7-21-34	98	.....					

Quotations by: ⁹A. E. White Co., San Francisco, Calif. ¹²James Richardson & Sons, Ltd., Winnipeg, Man. ¹³Securities Co. of Milwaukee, Inc., Milwaukee, Wis. ¹⁴Wise, Hobbs & Arnold, Boston. ¹⁵Martin Judge, Jr. and Co., San Francisco, Calif. ¹⁶Nashit, Thompson & Co., Toronto. ¹⁷First National Bank of Chicago, Chicago, Ill. ¹⁸Anderson Plotz and Co., Chicago, Ill. ¹⁹Hewitt, Ladin & Co., New York, N. Y.

F—Flat. †The payment is on arrears and leaves accumulated unpaid dividends of \$1.92½ a share.

Recent Dividends Announced

Riverside Cement Co.	
\$1.25 cum. Class A....	\$0.20 August 1, 1934
Riverside Cement Co.	
\$6.00 cum. 1st pfd....	1.50 August 1, 1934
Monarch Cement Co.....	2% July 5, 1934
Idaho-Portland Cement Co. (semi-annual)....	3.50 July 15, 1934
Northwest Portland Cement Co. (pfd.)..	1% of \$1.00 July 1, 1934

Florida Portland Cement Co., Tampa, Fla., reports balance sheet as of December 31:

	1933	1932
Assets:		
Property and equipment..	\$5,128,356	\$5,113,065
Organization expenses...	691,884	691,884
Current assets:		
Inventories	350,763	274,412
Cash and cash resources	438,763	250,739
Sundry receivables, net	247,450	257,082
Investments, etc.	11,658	42,058
Unamortized bonds, discounts and expenses...	59,156	73,184
Deferred charges	19,729	23,525
Total	\$6,947,759	\$6,725,950
Liabilities:		
Preferred stock	\$4,997,100	\$4,997,100
Common stock	1,100	1,100
First 6 mos. 1937.....	1,333,779	1,446,000
Current liabilities:		
Accounts payable and accruals	180,764	30,037
Depreciation and depletion reserves	764,957	657,393
Deficit	329,942	405,680
Total	\$6,947,759	\$6,725,950
Current assets	\$1,036,976	\$ 782,233
Current liabilities	180,764	30,037
Working capital	856,212	752,196

Uvalde Rock Asphalt Co., San Antonio, Tex., reports net loss after depreciation, etc., for the calendar years:

	1933	1932
Years ended December 31..	\$131,589	\$285,413
Earned per share.....(d)	\$21.93	(d)\$47.57
Number of shares, 6,000.		
*Current assets	\$729,798	\$863,576
Current liabilities	18,031	22,586
Working capital	711,767	840,990
*Includes cash and marketable securities: 1933, \$35,779; 1932, \$54,768.		

Lehigh Portland Cement Co., Allentown, Penn., reports for 12 months ended June 30, 1934, net profit of \$24,020, after taxes, depreciation, depletion and obsolescence, equal to 15 cents a share on 157,817 (par \$100) shares of 7% preferred stock. This compares with net loss of \$1,937,427 for the 12 months ended June 30, 1933.

Materials Service Corp., Chicago, Ill., reports for the calendar years 1933 and 1932:

	1933	1932
Sales		\$2,943,721
Cost of sales, including depreciation	Not Avail.	2,906,819
Federal taxes		
Net income	\$ 86,526	\$ 36,902
Shares of common stock outstanding (par \$10)..	121,450	125,000
Earnings per share.....	\$0.71	\$0.30
CONSOLIDATED BALANCE SHEET		
Assets:	1933	1932
Current assets	\$1,437,881	\$1,327,053
Fixed assets	1,943,022	2,024,374
Other assets	980,154	1,152,437
Good-will	1	1
Treasury stock	32,450	
Total	\$4,393,509	\$4,503,865
Liabilities:	1933	1932
Current liabilities	\$ 888,906	\$ 769,272
Capital stock	1,250,000	1,250,000
Capital surplus	837,071	866,833
Profit and loss surplus...	1,392,530	1,422,761
Minority interest	25,000	25,000
First mortgage bonds....		170,000
Total	\$4,393,509	\$4,503,865

Warner Co., Philadelphia, Penn.: The Wawaset Securities Co., organized by Charles Warner to acquire the Van Sciver interests in the Warner Co. (ROCK PRODUCTS, July, 1934, p. 35) has a capitalization of 48,150 shares of 8% preferred stock, \$10 par, and 96,300 shares of \$1 p.r common stock. It has acquired from the Van Scivers 53,500 shares of second preferred stock, the entire issue, and 80,250 shares of a total of 181,780 shares of common stock of the Warner Co. The second preferred stock has equal voting power with the common stock. There is also an issue of 27,341 shares of \$7 first preferred stock, with voting power, of the Warner Co. The Van Scivers will have no direct interest in the stock of the Warner Co., but will retain a small portion of the stock of the Wawaset company. The Wawaset Securities Co. will also be used as part of a management incentive plan, Mr. Warner stated on June 8. A portion of the common stock of the Securities company is being assigned for a management incentive fund for ultimate distribution among officers and principal employees of the Warner Co.

For the years ending December 31, the Warner Co. reports:

	1933	1932
Sales	\$2,368,556	\$3,821,286
Costs	1,899,647	3,184,566
Depreciation and depletion	\$987,031	700,896
Loss	518,122	64,176
Wholesale sales expense	129,685	157,179
Administration expense	165,358	235,106
Provision for credit losses	43,788	35,600
Discount allowed	103,310	151,173
Loss	960,261	643,234
Interest, dividends, etc., received	10,886	11,783
Discount earned	35,141	53,385
Loss	914,234	578,066
Bond interest, etc.	410,741	403,452
Amortization	37,030	37,188
Loss	1,362,005	1,018,706
Miscellaneous deductions	107	1,168
Net loss	1,362,112	1,019,875
First preferred dividends		48,643
Deficit for year.....	1,362,112	1,068,518
Earned per share, common	(d)10.61	(d)6.77
Number of common shares	181,780	234,242
†Excludes sales of products at wholesale prices from producing departments to retail departments; the figure comparable with 1932 and prior years as given above is \$2,738,181.		
‡Includes \$439,675 of depreciation charged by company to "other income deductions" rather than to costs.		
§Reflects changes arising from declaring operative the readjustment plan dated May 4, 1933.		
(d) Deficit.		

The balance sheet of the company as of December 31, 1933 showed total assets of \$12,700,775 as compared with \$17,436,122 on December 31, 1932, the difference being due to a financial reorganization. Current assets December 31, 1933, were \$1,163,248 and current liabilities \$168,588, leaving a working capital of \$994,660.

Schumacher Wall Board Corp., Los Angeles, Calif., reports for the fiscal year ended April 30, 1934, a net loss of \$45,051, including \$15,467 charged for depreciation and \$10,908 representing the company's portion of the loss sustained by its subsidiary, Gypsum Products Corp. This compares with a net loss of \$54,978, including a sub-

sidary loss of \$25,571 reported for the preceding fiscal year.

In a letter to stockholders, A. R. Moylan, vice-president and general manager, said: "A marked improvement has been noted in the last two months in the operation of the Gypsum Products Corp., subsidiary, which has resulted in a small profit. This is the first time in three years that the company has reported a profit. Also during the last three months, the Schumacher Wall Board Corp.'s losses were less than at any time during the past two and one-half years. With the improved condition of the banks, a relaxing of credit, and the measures adopted by Congress to aid our industry, it is believed that the building industry will be considerably revived by the end of the year."

The balance sheet as of April 30, 1934, shows total current assets of \$98,386 and total current liabilities \$62,167, indicating a net working capital of \$36,219. This compares with current assets of \$122,783, current liabilities of \$61,511 and indicated net working capital of \$61,272 in the preceding fiscal year.

Calaveras Cement Co., San Francisco, Calif., reports for the years ended December 31:

	1933	1932
Operating profit	\$219,411	\$186,521
Other income	15,694	19,365
Total income	235,105	205,887
Selling, administration and general expense	157,411	148,911
Depreciation and depletion	109,655	111,524
Experimental work		9,593
Net loss	31,961	64,141
Preferred dividends	140,129	140,824
Deficit for year.....	172,090	204,965
Surplus, January 1.....	346,038	551,004
Surplus, December 31.....	173,947	346,038

Current assets, including \$191,082 cash, amounted to \$637,720 against current liabilities of \$76,112, on December 31, 1933.

Dividends on the company's 7% cumulative preferred stock, which were maintained during 1933, at the regular rate of \$1.75 a share quarterly, were discontinued with the first quarter this year and none was declared for the second quarter, leaving a current arrearage of \$3.50 a share. Commenting upon this action, Wm. Wallace Mein, president, in the annual report to stockholders, says: "In view of the unfavorable marketing conditions generally prevailing thus far in 1934, your board of directors deemed it prudent to discontinue preferred dividend payments until such time as improved conditions warrant their resumption."

Discussing the year's operations, Mr. Mein further says, "In keeping with the company's policy of maintaining its plant thoroughly modern, there was expended for capital improvements made during the last fiscal year, \$86,551.

"Prices for cement sold during 1933 continued unfavorable. Largely because of cement demand created by public works projects, volume of cement sales, thus far in 1934, is appreciably better than for the corresponding period of a year ago. The average mill net prices, however, have been unsatisfactory."

Rock Products News Briefs

Sand and Gravel

Warner Co., Philadelphia, Penn., is shipping gravel to Palm Beach, Fla., for the Lake Okeechobee flood control project. The gravel comes in 3,000-ton lots in ocean-going freighters to the port of Palm Beach, where it is transferred to barges.

Schmidt Sand and Supply Co., Garfield Heights, Cleveland, Ohio, is being sued for \$8 by the Pennsylvania R. R. for an alleged unpaid shipping bill. Rules of the Interstate Commerce Commission require public carriers to make every possible effort to collect bills, regardless of the amount of collection costs.

Wichita Flint Gravel Co., Norton, Kan., has begun production with a new plant, making shipments of about six cars a day.

Tesnatee Gold and Gravel and Sand Interests, Nacoochee, Ga., is installing a plant to recover placer gold and make commercial sand and gravel.

Standard Sand and Gravel Co., Clinton, Ind., has been sold by its receiver to M. A. Hinsey and Frank Jordan. The name of the new company will be the Standard Materials Corp.

Fischer Lime and Cement Co., Memphis, Tenn., W. W. Fischer, president, has been selected to head a housing survey program sponsored by the National Federation of Builders' Supply Associations.

Meramec Portland Cement and Material Co., St. Louis, Mo., is plaintiff in another suit growing out of the dissolution of the Standard Building Materials Co., one of the two mergers of sand and gravel interests in St. Louis several years ago. The plaintiff asks damages of \$205,314 from the Missouri Portland Cement Co., the Mississippi River Sand and Material Co. and five directors of the Standard Building Materials Co. A similar suit was filed recently against the same defendants by the Ratermann Building and Contracting Co., alleged to be one of the parties to the merger agreement, asking for \$193,504 damages. (See ROCK PRODUCTS, July, 1934, p. 36.)

Sugar Grove Sand and Gravel Co., Rock Bridge, Ohio, has opened a new plant and is now in production. Grover Carpenter and Delmar Tater are the owners.

Neal Gravel Co., Attica, Ind., is reported to be operating on a 24-hour basis. Three shifts work 7 hours each, the other three hours being devoted to maintenance and repair.

Nugent Sand Co., Louisville, Ky., will replace immediately equipment destroyed in recent fire (see ROCK PRODUCTS, July, 1934, p. 35.)

Lime

Rockland and Rockport Lime Corp., Rockland, Me., was placed in receivership July 5 by order of the state supreme court. George B. Wood, president, has been appointed general receiver. Mr. Wood issued the following: "In order that there may be no misunderstanding regarding this change in the corporation's affairs, I wish to make the following statement: This receivership is at the request of the bondholders' committee and the directors of the corporation, not at request of any merchandise creditors. Complete plant operations are being continued by the receiver, with no change in the personnel of executive officers or sales force, pending a proposed transfer of ownership to a new successor corporation to be organized as soon as necessary legal steps can be completed. There will be no interruption to the facilities of the corporation for affording its customers prompt and satisfactory service as in the past."

American Lime and Stone Co., Bellefonte, Penn., has made improvements costing approximately \$25,000, including a new gas producer. The two rotary kilns have hitherto been supplied by two producers, the new one will serve either to supplement the present gas supply or serve as a reserve when one of the others is down. The company will begin mining limestone on the 600-ft. level in October.

Gypsum

United States Gypsum Co., Chicago, Ill., has been made co-defendant in a suit for \$10,000 by the administrator of the estate of a man killed on the highway in Tennessee by one of the company's employees, J. V. Pucket, of Chattanooga. Mr. Pucket was arrested and charged with murder after he had struck and killed a pedestrian, but was discharged by a Johnson City magistrate.

Australian Gypsum Products, Pty. Ltd., Melbourne and Sidney, Australia, will build the most modern plant possible in the near future. This company is a merger of several concerns formerly operating a number of plants. G. H. Limb, managing director, and Mrs. Limb were recent visitors in Chicago, Ill. They are on their way around the world.

Universal Gypsum and Lime Co., Chicago, Ill.: Reorganization under the new federal bankruptcy law is asked by creditors. The company has been in receivership since

April 22, 1929. The petition of the creditors sets forth that depreciation and shrinkage of assets have left the concern with a deficit of \$3,100,000. Funded debt is \$1,754,800.

Syracuse Plaster Works, Syracuse, N. Y., was damaged by fire July 3.

Slag

Standard Slag Co., Jackson, Ohio, has agreed to operate under labor agreement with the International Union of Mine, Mill and Smelter Workers for a period of five years. The two other major industries of Jackson made the same agreement. The agreement calls for 8 hour work days with a wage scale in proportion with that of the United States Steel Corp. However, the daily wage of skilled men is raised to \$3.43, truck drivers to \$3.50 and the wages of other classes are to remain the same. A provision was placed in the agreement whereby the company officials are to issue a 72-hour notice to all employes of any impending shutdown, while workers must do the same in case of a proposed strike.

Silica

Discovery of a new chemical called silica black, found by Dr. C. A. Jacobson of West Virginia University was reported to the American Chemical Society. It is made by mixing powdered bituminous coal and powdered diatomite, a form of silica, produced millions of years ago by small organisms living in the sea. Commercially the silica black appears to have big possibilities because of the tremendous size of the industry in which its catalytic powers have been demonstrated as superior. Experiments conducted by Dr. Jacobson and Dr. Loring R. Williams indicate that the silica black is useful as a pigment for paints that will resist both acid and rust, and for printing inks, shoe blacking and stove polish. It can form a good "carrier" for insecticides, and be used in wood graining and in leather tinting.

Silicosis suits in Missouri may not be so frequent now that the state supreme court has formally incorporated into its rules the reform program recommended by a judicial commission of lawyers appointed by the court last November to conduct a survey of the practice of law in Missouri and to propose effective methods for regulation of the bar.

The procedure for disbarment of attorneys for unprofessional and unethical conduct will be facilitated under the new rules, which will become effective November 1. The canons of ethics approved by the American Bar Association are adopted as a part of the rules. This move will make the practice of soliciting personal injury suits, known as "ambulance chasing," a ground for disbarment proceedings.

Editorial Comments

It did not require much foresight to see that provisions of the various codes aimed to establish minimum selling prices would not immediately

Prices and the NRA Codes

work out to the satisfaction of buyers. Everyone is a buyer except of the particular product he sells. The result is always an overwhelming majority of buyers as distinct from any one group of producers or manufacturers. Very few, if any, groups of producers have whole-heartedly accepted their own medicine, when they happened to be in the position of buyers. Producers who profess, and to some extent practice under their own codes, a policy of "live and let live" have been exceedingly reluctant to apply it to industries selling them products.

The Government itself has shown the same lack of consistency. The NRA, in numerous instances, has defended price increases as necessary to pay additional labor costs, but PWA, the army and navy departments, and others which do the Government purchasing have raised a terrible howl because prices were high, or were uniform, etc., as they must have been under the codes approved by NRA and the President. The President himself capped the climax by his recent order inviting industries to return to price cutting on Government bids.

The executive order of the President inviting bidders on Government contracts to cut prices 15 per cent below the posted prices under their codes is a very serious blow to the whole industrial set-up under the NRA and the code authorities because it shows such an utter lack of understanding of the problems faced by industry, and because this order was issued apparently without consultation with NRA at the urging of Secretaries Dern and Ickes, because they were peeved by the uniformity of bids, but apparently without effort to determine whether the prices bid were fair or not. If producers weaken because of this order, they will nullify all efforts put forth in the last year to bring order out of chaos, which practically every one of them accepted as the objective of the NRA and of the President.

Almost coincidentally with the President's order, the NRA reopened the codes for the cement and crushed stone, sand and gravel, and slag industries for revisions, ostensibly asked for by the code authorities. But this apparently was a trap to get the codes reopened so that the consumers' advisory board and research and planning division of NRA might have an opportunity to rewrite the codes in line with standard provisions to govern "a new price policy," which was first announced as to be applied at once to all uncoded industries, and to the coded ones as fast as they could be persuaded to reopen their codes.

Producers themselves, as we said at the beginning of these remarks, are largely responsible for this new price policy in that they have not done a better job of educating each other and the NRA in the essentials of what constitutes a fair price and how it is arrived at. At the recent annual meeting of the National Association of Purchasing

Agents several members of the NRA consumer advisory board and research and planning division spoke very frankly of the pricing policy they were developing and all paid full tribute to the purchasing agents for help given them in developing this policy. For example, Prof. Paul H. Douglas (consumers' advisory board) said: "I have frequently found very sharp differences of opinion between the purchasing agents of corporations and the managements of these corporations, which all too frequently tended to be influenced by the sales idea and philosophy to the almost complete exclusion of the purchasing philosophy."

Here, obviously, was a case of trying to play both ends against the middle—managements instructing or encouraging their purchasing departments to undermine the open-price and sales below cost provisions in the codes for other industries while at the same time begging the NRA to uphold the same provisions in their own codes. Naturally, the theorists of NRA saw only too clearly the inconsistency and the selfishness of this attitude, and naturally they took sides with the party which seemed to have the weight of public interest. Nevertheless, they were not blind to the abuses of concentrated purchasing power. The logic in their point of view is convincing of the sincerity of their effort to solve this very difficult problem of conducting open price plans so as to prevent monopolistic price fixing and at the same time check destructive price cutting.

They said that the NRA has purposely allowed many varieties of open price plan, cost of production, sales below cost and production control provisions to be written into the various codes so that they might gain some experience with their operation and be able to pick the good from the bad with the ultimate intention of standardizing these features in all the codes. The weakness of their position is that they have hardly given the industries a chance to try them, and that consciously or unconsciously they were not inclined to give them a fair trial. They are actually trying to find all the holes possible and to pounce upon this as evidence of price-fixing.

Evidently as a result of the vigorous protests of the cement, crushed stone, sand and gravel, and slag industries, the NRA on July 16 issued a new statement of policy designed apparently to reassure industry that this new price policy would not be forced into the codes. It said: "As to approved codes, there will be no change so long as provisions not flatly inconsistent with the essentials of the policy are causing no difficulty, but in such cases the research and planning division and NRA deputies must observe operation." In other words, the industries are put on their good behavior and it is up to them to show that they can make their own open-price plans, below cost sales prohibition, production control, and other code provisions work in the interests of the public as well as in their own interests. This is fair enough; and producers should be broadminded enough to see its application to their purchasing departments as well as to their sales departments.

Pump at Top of Plant Handles Fine Sand to Waste or Storage



Left: Self-priming pump installation on top of bins at Terre Haute Gravel Co. plant. Right: Sump designed especially for this installation

AT THE PLANT of the Terre Haute Gravel Co., Terre Haute, Ind., there has always been an excess of fine sand which had to be wasted—at least until such time as a market is found for it. Originally this excess of fine sand was sluiced to the worked-out part of the dredge pond by gravity as is done at many similar operations. Eventually a place had to be found for it elsewhere and the problem arose of moving it to a less troublesome location.

Various pumping methods, rehandling the material, were tried, but the solution, of the problem finally adopted is rather unique as

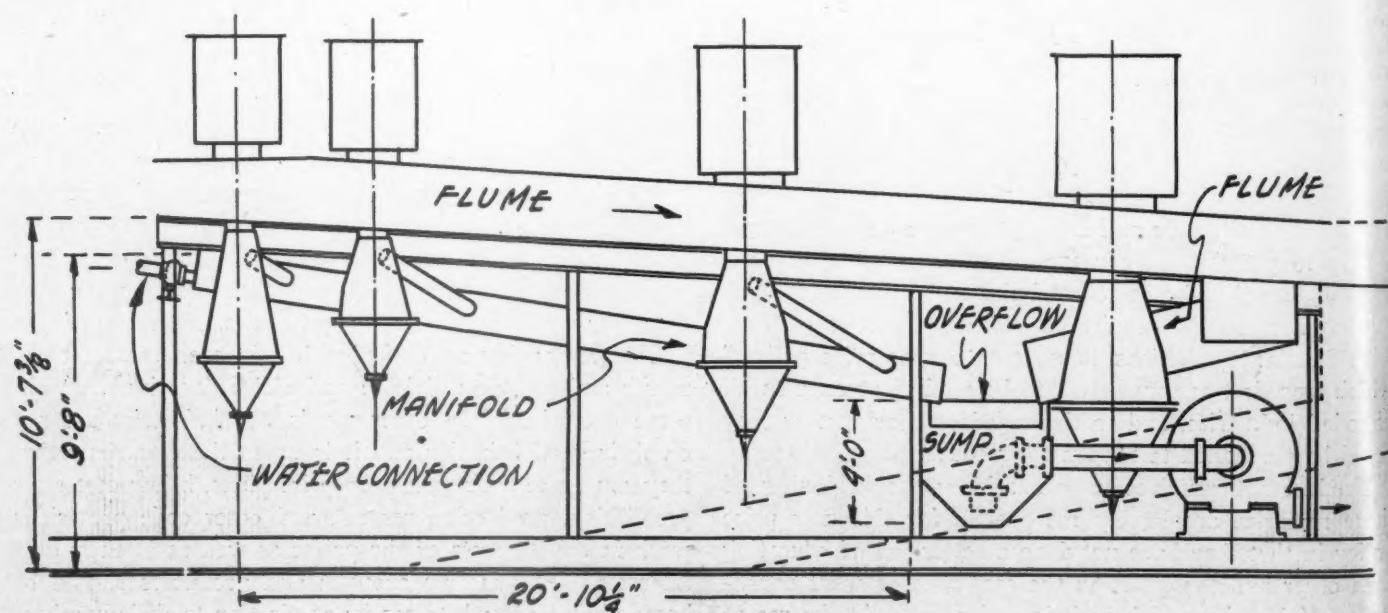
well as ingenious. This consisted of placing the pump on top of the bins where the overflow from the original washing screens and Shaw classifiers is directed to a steel-box sump or hopper, into which the pump suction is inserted. This pump, an 8-in. Type "C" Amsco dredge pump, handles the material as fast as it comes, with a 150-hp. Westinghouse motor, replacing two 10-in. pumps with a combined power of 400 hp., formerly required.

The accompanying illustrations show the details of the installation. It will be noted that the pump is installed in close quarters,

requiring a 90-deg. elbow in the suction. When the operation is shut down, there is a little cone of sand left just at the suction opening. The pump is self-priming, and designed to handle just the amount of material fed to it. Additional water is supplied from an overhead pipe not shown in the illustrations.

Plant Built in 1929

This plant of the Terre Haute Gravel Co. was new in 1929 and was described in detail in *ROCK PRODUCTS*, August 3, 1929. The installation described was made late in 1932



Plant diagram showing installation for handling fines.

and has proved eminently satisfactory ever since.

Contracts Let—Bids Received

Hastings, Neb.: Prices bid by contractors for furnishing and placing gravel on five road projects varied from 68c to 96c per cu. yd.

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Schuyler, Neb.: County commissioners awarded contract to Mentzer and Long for 800 cu. yd. of gravel at \$1.49 per cu. yd. delivered on the road. Other bids were \$1.64 and \$1.79.

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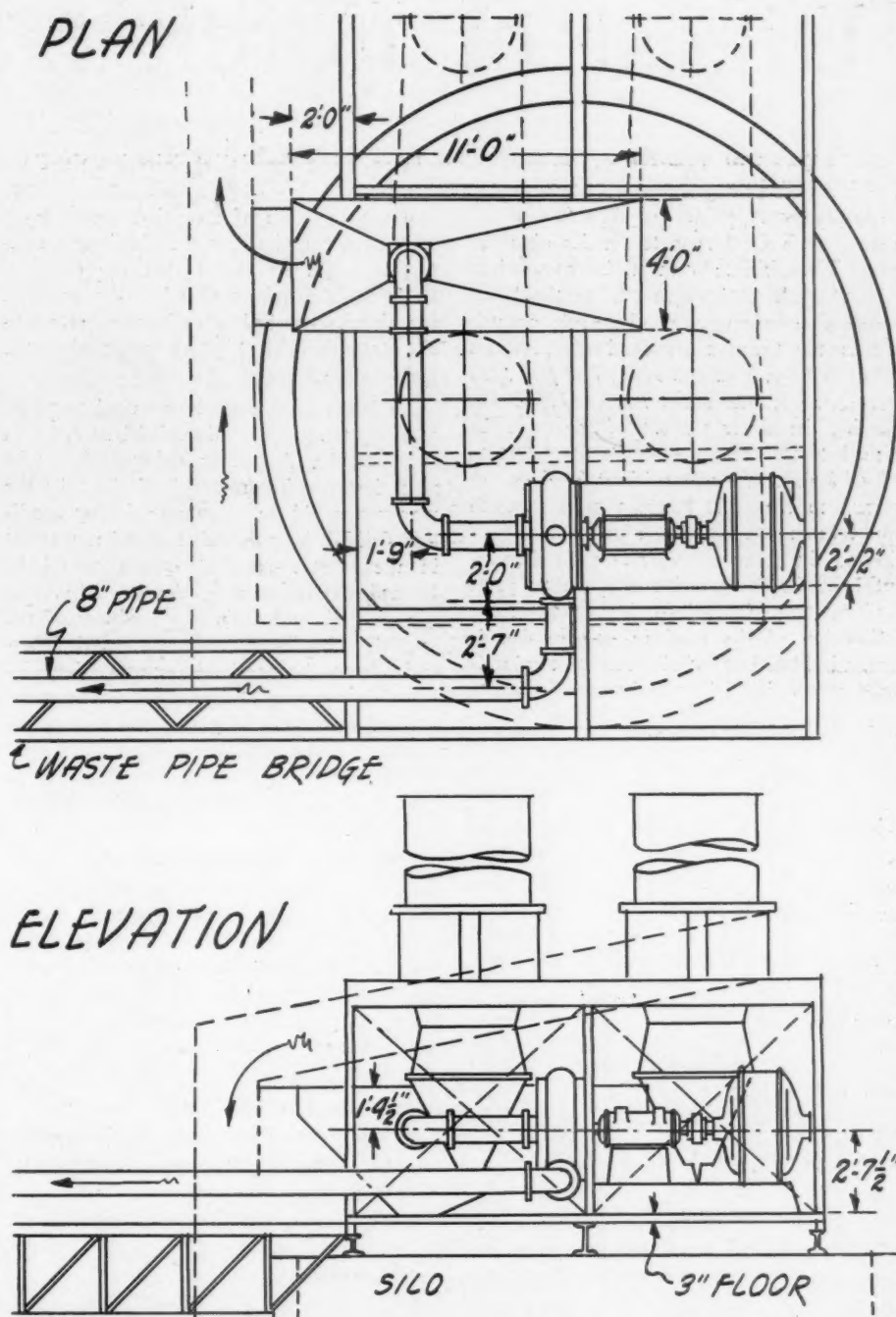
Omaha, Neb.: Peter Kiewit Sons Co. bid low on county highway gravel at 45c per ton, f.o.b. pit. H. J. Petersen Co. bid \$1.10 per ton at various rail destinations. Both were low bidders, but on different base prices.

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Tiffin, Ohio: Contract for furnishing 5,000 tons of stone, more or less for street work was awarded to Lester Morton of this city. Contract price was \$1.35 a ton for stone and \$1.20 a ton for stone sand. Louis Dehmer, also of this city, submitted the only other bid, offering to furnish stone at \$1.35 a ton.

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Fort Peck Dam, Mont.: Ten identical bids at \$2.7054 per bbl. were received recently for 600,000 bbl. of cement. Mill prices ranged from \$1.85 for the Three Forks Portland Cement Co., Trident, Mont., to \$1.15 for the one with the largest freight rate. Contract let for 200,000 bbl. to the Ash Grove Lime and Portland Cement Co., Louisville, Neb., whose mill price figured \$1.19. Secretary of War Dern had much to say about the uniformity of prices bid, and his remarks have been published in newspapers throughout the country. He said he did not propose to buy the remaining 400,000 bbl. (and further requirements) until manufacturers revised their prices in line with a more nearly uniform mill price, contending that a spread of 61% in mill base price was not justified.



Plant of the Terre Haute Gravel Co., Terre Haute, Ind. Above: Diagrams of pump installation

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Pittsburgh, Pa.

Experiments with an Aluminous Cement. Otto Graf reports results obtained with Rolandshütte cement in comparison with a high early strength portland cement. Compressive strengths made according to the German standard specifications were: 3 days, 5542 and 9705; 7 days, 10,225 and 12,570 lb. per sq. in., respectively. On varying the water content of the mix, the ratio between the two cements was close to 2.0 at 3 days and about 1.5 at 28 days. In regard to the ratio between cube strength and column strength, the aluminous cement showed the same decrease in ratio dependent upon its compressive strength as portland cements. On reinforcing columns, the full value of the steel in compression is realized. Shrinkage of rich mortar of aluminous cement is slightly higher at the beginning, but develops less rapidly later on than for the high early strength portland cement. —*Beton und Eisen* (1934) 33, No. 10, p. 156.

Physical and Chemical Properties of Cement and Concrete. Paper presented before the Society of Swedish Engineers in Great Britain by the Swedish cement experts, D. Werner and S. Giertz-Hedström. Working with different cements they prepared 500 test specimens according to the Swedish standards with an earth dry mix; as many more by the Swiss standards with plastic mortar; and another 500 with graded sand and still more water (corresponding to several recent researches in the U. S.). On analyzing the results it was concluded that the last gave appreciably more satisfactory results than the other two. By that method a definite relationship was observed between compressive and bending strengths, $T = 1.2 CV^{2/3}$. (The $2/3$ power relationship had previously been observed by Feret as a result of the study of published data.) This means that for practical purposes the bending test is quite adequate. The modulus of elasticity for neat cement is given by the equation $E = k\sqrt{CT}$. Believing that a similar relationship must hold for mortar, it is suggested that a single strength determination is adequate for the calculation of this value.

The water in concrete includes that in true chemical combination as a result of the hydration reactions, partially combined water held in the cement gel, and free water in the capillaries. Volume changes are due to movement of the partially combined water in the gel. The cracking tendency depends upon several factors, being proportional to the shrinkage stresses and inversely to the tensile strength, so that the cracking tendency is least when the material combines a low shrinkage with high tensile strength

and low modulus of elasticity. Based upon the above equation for the elasticity modulus, it might be stated that the cracking tendency is a minimum when the material has simultaneously low shrinkage and a tensile strength fairly high as compared to the compressive strength.

An interesting method was used to study cracking tendency. A threaded iron rod was surrounded with mortar, using a glass tube as a form. After removal of the tube the specimen could be given any drying condition desired. The threads resisted movement in the mortar so that cracks would be formed depending upon the elasticity, tensile strength and shrinkage tendency of the cement. Aluminous cements behaved differently from the portland cements. Very interesting results were obtained with a portland cement containing 4% bituminous admixture; while plaster, owing to practically no gel structure, developed no cracking at all. —*Tonindustrie Zeitung* (1934) 58, No. 40, p. 484.

Reinforced Concrete Problems. Otto Graf of Stuttgart discusses shrinkage and creeping in concrete and the resultant stressing of the steel, with remarks on the determination of permissible stressing of concrete and steel. Some of the problems constantly recurring in reinforced concrete construction include.

1. The production of concrete with reduced volume change.
2. The limitation of the permissible tensile stressing of the steel, relative to its yield point.
3. The limitation of the compression stressing of the steel, relative to its carrying capacity.

The first problem is very important also in road construction and includes: the effect of the cement and of the content of cement; the effect of the other constituents of the concrete; the interpretation of the results from volume change measurements; the study of external conditions of temperature and moisture affecting the concrete; and careful consideration as to the transfer of research results to actual construction.

Cements differ in volume change and also in resistance to cracking tendency resulting from shrinkage. For instance, a cast-stone manufacturer changed his brand of cement and ran into trouble with shrinkage cracking. Tests showed that the second cement not only had lower tensile strength but developed more shrinkage. Another instance was given where a standard cement developed considerable crazing, but on being ground finer much less trouble was observed.

Since the cement does the shrinking, re-

duction thereof might be expected to be helpful, but crack formation depends also upon tensile strength, so that a suitable balance must be reached. The water content of the mix has some effect on volume change; the greater the amount of water the more open the gel structure and the more rapid and the greater the volume change. At the same time the well-known and harmful effect of greater amounts of mixing water on tensile strength must be considered as to crack development.

The aggregates in the concrete exert considerable influence on the shrinkage, and here the compressibility is important, varying, as it does, to give a modulus of elasticity ranging from about 300,000 to about 14,000,000. Graf has observed the following shrinkages: Variegated sand stone, 0.105%, granite 0.067%, and basalt 0.053% under similar conditions. The effect of admixtures and of the grading is often appreciable.

As the drying is a long-drawn-out process, shrinkage follows slowly, and in dry rooms can reach an important magnitude in the course of time. The result of this analysis is to expect most reinforced concrete to contain shrinkage cracks, but the steel and the rest of the structure often markedly hinder cracking, and other factors are operative in reducing this action. The extensibility of the concrete has some effect as well as the size of the test specimen. For instance, one specimen 7x7x17 cm. in 202 days shrank twice as much as a specimen 20x20x100 cm. The creepage of the concrete has a very important effect, Graf reporting a compression of 0.07% in a specimen 30x30x130 cm. under a load of 640 lb. per sq. in. for one year. Creepage also occurs under tensile loading. Glanville (*Structural Engineer*, February, 1934) reports a creepage of 0.01% in four months under a tensile load of 140 lb. per sq. in. This stretching reduces the cracking appreciably and is especially important when it is remembered that dry concrete appears to creep more than when stored wet. The richer mixes show less creepage than the leaner ones, but this is often neutralized by the higher loads applied to the former.

While it is hardly possible to expect to eliminate all crack development in reinforced concrete, it should not be difficult to reduce it greatly. To help develop the necessary information experiments have been carried out on actual structures. Beams exposed to the weather show much smaller shrinkages than those in structures which are heated in winter, the observed shrinkage in the former being about 0.02% with stress developed in the steel below 1400 lb. per sq. in. —*Beton und Eisen* (1934) 33, No. 11, p. 165.

Rock Products News Briefs

Crushed Stone

Citrus County Stone Co., Brooksville, Fla., will erect a 600-ton per day plant to cost approximately \$100,000. Construction is under the supervision of J. C. Johnston, consulting engineer, Tampa, Fla.

Alabama: Following the advice of the Alabama Experiment Station, Auburn, Ala., and the U. S. Department of Agriculture, fertilizer manufacturers will next year furnish Alabama farmers with non-acid-forming fertilizers. This will be done by the manufacturers substituting dolomitic or dolomitic limestone for the sand which is at present being used for filler. Agreement that this will be done was reached in Montgomery on June 20 when fertilizer manufacturers met with the State Board of Agriculture and assured the board that they will gladly co-operate in producing fertilizers which will not make the farmers' soil acid. Under regulations passed by the Board of Agriculture each sack of fertilizer sold in the state will contain a tag labeled "acid-forming" or "non-acid-forming." This will not only apply to mixed fertilizers but to superphosphate and other fertilizers applied direct to crops. It was also agreed at the Montgomery meeting that the Experiment Station, the Extension Service and other agricultural forces of the state will continue to urge that farmers apply limestone to their land to off-set the acidity which it may at present have due to the continual use of acid-forming fertilizers during the past.

Louisville, Ky.: Court order, granted on application of ten property owners, after two days of testimony, forbids the county to operate a quarry in such a manner "as will cause the dwelling houses or other buildings of any of the plaintiffs herein, or the premises of any of the plaintiffs on which no houses are built, to be jarred to such an extent as to interfere with the reasonable enjoyment of said dwelling houses." Judge said he had no intention of compelling the county to stop operation of the quarry, but expressed the view that it could be conducted in such a manner as to comply with the provisions of the injunction.

J. E. Colman and associates have leased property at Corning, Ia., for 15 years for the purpose of opening a commercial quarry and producing crushed stone. The property contains a good quality of limestone.

Winners of National Safety

Contest for Quarries

THE WINNERS of the National Safety Competition of 1933, in which recognition was given to notable safety records attained during the calendar year 1933 by numerous mines and quarries, were an-

nounced recently by Scott Turner, Director, United States Bureau of Mines, Department of the Interior, which sponsored the contest. Three hundred and thirty-two mines and quarries in 35 states participated in the competition, and outstanding accomplishments were achieved in the operation of mines and quarries without accidents or with quite low accident rates in 1933.

In the group composed of quarries and open-cut mines, the winner of the Sentinels of Safety trophy, provided by the Hercules Powder Co., was the Rogers City limestone quarry, Rogers City, Mich., operated by the Michigan Limestone and Chemical Co., which worked 595,416 man-hours in 1933 with no lost-time accidents. This quarry also was given the highest award in this group in 1929 and 1932.

In the group comprised of quarries and rock products mines the following named operations were given honorable mention. All of these mines or quarries operated without a lost-time accident in 1933:

Billmeyer limestone and dolomite quarry, Billmeyer, Penn., of the J. E. Baker Co.
Inland limestone quarry, Manistique, Mich., of the Inland Lime and Stone Co.
Krause No. 1 limestone quarry, St. Clair County, Ill., of the Columbia Quarry Co.
Cape Girardeau limestone quarry, Cape Girardeau, Mo., of the Marquette Cement Manufacturing Co.
Ruegg limestone quarry, Ruegg, Mo., of the Missouri Portland Cement Co.
Bethlehem limestone quarry, Bethlehem, Penn., of the Bethlehem Mines Corp.
Hanover limestone quarry, Hanover, Penn., of the Bethlehem Mines Corp.
Winnfield limestone quarry, Winnfield, La., of the Southern Mineral Co.
No. 3 cement-rock quarry, Coplay, Penn., of the Coplay Cement Manufacturing Co.
Blue Mt. serpentine-stone quarry, White Hall, Md., of the J. E. Baker Co.
Bridgeport limestone quarry, Bridgeport, Penn., of the Bethlehem Mines Corp.
Nagney limestone quarry, Nagney, Penn., of the Bethlehem Mines Corp.
Geneva limestone quarry, Oaks Corners, N. Y., of the General Crushed Stone Co.
Nos. 5 and 6 limestone quarries, Martinsburg, W. Va., of the North American Cement Corp.
Union limestone and dolomite quarry, Mt. Wolf, Penn., of the J. E. Baker Co.
Ormrod cement-rock quarry, Ormrod, Penn., of the Lehigh Portland Cement Co.
No. 6 limestone and cement-rock quarry, Nazareth, Penn., of the Pennsylvania-Dixie Cement Corp.
No. 7 sandstone quarry, Amherst, Ohio, of the Cleveland Quarries Co.
West Conshohocken cement-rock quarry, West Conshohocken, Penn., of the Valley Forge Cement Co.
Akron limestone quarry, Akron, N. Y., of the General Crushed Stone Co.
Mason City limestone and clay quarry, Mason City, Iowa, of the Lehigh Portland Cement Co.
Auburn limestone quarry, Auburn, N. Y., of the General Crushed Stone Co.
East Fultonham limestone quarry, East Fultonham, Ohio, of the Pittsburgh Plate Glass Co.
Mitchell limestone quarry, Lehigh Lime Co., Lawrence County, Ind., of the Lehigh Portland Cement Co.

Speed limestone quarry, Speed, Ind., of the Louisville Cement Co.

Newington trap-rock quarry, Newington, Conn., of the Edward Balf Co.

Brooksville limestone and clay quarry, Brooksville, Fla., of the Florida Portland Cement Co.

Stringtown blue-limestone quarry, Stringtown, Okla., of the Southwest Stone Co.

Conway granite quarry, Conway, N. H., of the Maine and New Hampshire Granite Co.

San Vicente limestone quarry, Davenport, Calif., of the Santa Cruz Portland Cement Co.

Middlefield No. 1 trap-rock quarry, Middlefield, Conn., of the Connecticut Quarries Co., Inc.

Pembroke limestone quarry, Pembroke, Va., of the Pembroke Limestone Corp.

Union Furnace limestone quarry, Tyrone, Penn., of the American Lime and Stone Co.

Stockertown cement-stone quarry, Stockertown, Penn., of the Hercules Cement Corp.

Birmingham limestone quarry, Birmingham, Ala., of the Lehigh Portland Cement Co.

Richard City limestone quarry, Richard City, Tenn., of the Pennsylvania-Dixie Cement Corp.

Lime plant limestone quarry, Thomaston, Maine, of the Lawrence Portland Cement Co.

Greencastle limestone quarry, Greencastle, Ind., of the Lone Star Cement Co., Indiana, Inc.

No. 6-X sandstone quarry, Amherst, Ohio, of the Cleveland Quarries Co.

Union Bridge limestone quarry, Union Bridge, Md., of the Lehigh Portland Cement Co.

Martins Creek No. 4 cement-rock quarry, Martins Creek, Penn., of the Alpha Portland Cement Co.

Hillsville limestone quarry, Hillsville, Penn., of the Union Limestone Co.

Catskill limestone quarry, Catskill, N. Y., of the Alpha Portland Cement Co.

Nazareth cement-rock quarry, Nazareth, Penn., of the Lone Star Cement Co., Pennsylvania.

Lone Star limestone quarry, Greenport, N. Y., of the Lone Star Cement Co., New York, Inc.

Fordwick limestone quarry, Fordwick, Va., of the Lehigh Portland Cement Co.

Fogelsville limestone quarry, Fogelsville, Penn., of the Lehigh Portland Cement Co.

Cheshire No. 6 trap-rock quarry, Cheshire, Conn., of the Connecticut Quarries Co., Inc.

Petoskey limestone quarry, Petoskey, Mich., of the Petoskey Portland Cement Co.

Independence limestone and shale mine, Independence, Mo., operated by the Missouri Portland Cement Co.

Wampum limestone mine, Wampum, Penn., of the Crescent Portland Cement Co.

Crystal City sand mine, Crystal City, Mo., of the Pittsburgh Plate Glass Co.

Gardners' white-clay mine, Mt. Holly Springs, Penn., of the Medusa Portland Cement Co.

Akron gypsum mine, Akron, N. Y., of the Universal Gypsum and Lime Co.

Columbia No. 3 limestone mine, Valmeyer, Ill., of the Columbia Quarry Co.

The National Safety Competition of 1933 revealed a larger number of accident-free mines and quarries in proportion to the total number enrolled than in any previous year. The contest also revealed more plants with remarkably low accident rates.

Safety Victories Celebrated by Cement Mills

● Nine Plants Hold Ceremonies and Outings to Commemorate Perfect Records in 1933

TO celebrate their part in the greatest safety record made by member plants of the Portland Cement Association to date, in which 53 plants completed the calendar year 1933 without loss of time through accident, nine cement mills held their trophy dedications and attendant festivities during the last few weeks.

Practically all of these affairs have been more spirited and more largely attended than similar occasions during the past two or three years, presenting plenty of evidence that safety interest is on the increase. These affairs also indicated the splendid esprit de corps with which the cement mill operating organizations have come through a long period of depression, which still has 74% of the industry's capacity idle and worker's weekly time limited to 36 hours. But reduced income seems to have impressed the thousands of cement-mill workmen that now, more than ever, safety pays.

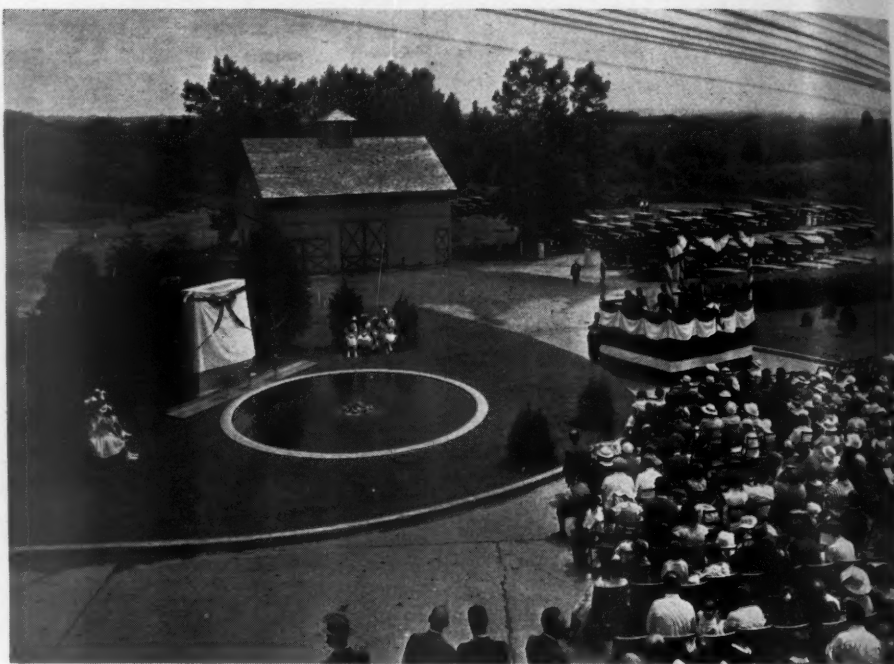
Clinchfield, Georgia, Turns Out

On June 22, the Clinchfield, Ga., plant of the Pennsylvania-Dixie Cement Corp. dedicated its trophy before one of the most distinguished gatherings ever held in the central part of the State. More than 1100 persons had assembled in the big tent erected on a plot near the plant office building.

E. P. Newhard, plant superintendent, acted as master of ceremonies. The speakers included the Hon. John B. Wilson, Secretary of State of Georgia; Blaine S. Smith, president, and W. H. Klein, general operating manager of Pennsylvania-Dixie; G. W. Rhodes, chief chemist of Clinchfield plant, and H. R. Albion, southeastern manager of the Portland Cement Association, who presented the trophy.

Among the distinguished guests at the ceremony were Governor Talmadge of Georgia and party, including Mrs. Talmadge and Col. John M. Wilkerson of the Governor's staff; Judge Louis L. Brown, Mayor Herbert Smart of Macon, Mayor A. M. Anderson of Perry, Ga., Rev. E. P. Moye and a large delegation of visiting Pennsylvania-Dixie officials.

At the conclusion of the ceremonies a barbecue dinner was served in the adjoining grounds. W. G. Riley, plant safety director served as general chairman and in that ca-



Safety trophy of Lone Star Cement Co., Hudson, N. Y., before unveiling ceremonies

capacity directed the various committees of plant men which were responsible for the details.

New York Plant Has Picnic

The Hudson plant of the Lone Star Cement Co., New York, dedicated its trophy on June 23. President Charles L. Hogan brought a large party from the New York City office of the International Cement Corp. (of which the Lone Star company is a subsidiary) by special train to attend the festivities and Vice-President D. P. Cooper brought prominent guests from Albany. Many of the other cement plants of the state were represented.

Immediately after the program the entire company of about 800 people moved into the natural park on the plant property where luncheon and various refreshments were served, followed by an excellent schedule of sports and contests which continued throughout the afternoon. G. A. Hummel was general chairman, being assisted by four able committees of plant foremen and workmen.

St. Louis Plant Unveils New Trophy

One of the most interesting trophy dedication ceremonies of the year occurred at the Prospect Hill plant of the Missouri Portland Cement Co., June 30. The mayor of St. Louis, B. F. Dickmann, made the principal address.

After a picnic lunch there was a long schedule of sports and competitions. Several hundred persons attended.

Iowa Celebrates

At Des Moines, Iowa, the Valley Junction plant of the Pennsylvania-Dixie Cement Corp. rededicated its Portland Cement Association trophy on June 26.

The general safety committee of the plant

is composed of the following men: R. A. Bechtold, superintendent; M. L. Silcox, chairman and safety director; C. W. Ellis, purchasing agent; J. W. Trimble, master mechanic; J. H. Henderson, mill foreman; S. H. Griffith, mill foreman; Otis Parker, mill foreman; Floyd Thornsberry, chief electrician; Thomas Miller, yard foreman; Harry Thompson, machinist; Lee Eslinger, crusher; O. E. Roe, Modern Valve Bag Co.; Bert Sherwood, foreman, Modern Valve Bag Co.

Universal Celebrates in Grove

On July 14, the plant of the Universal Atlas Cement Co., Universal, Penn., celebrated. Owing to the extremely warm weather the program was not held around the plant safety trophy but in the grove in the plant park. Many distinguished industrialists from the Pittsburgh district were present, including officials of the local cement and steel plants.

Former Governor John S. Fisher of Pennsylvania was the chief speaker, and the guests of honor were I. Lamont Hughes, president, and L. H. Burnett, vice-president of Carnegie Steel Co., and A. J. R. Curtis of the Portland Cement Association. President William B. Rodgers and Secretary George E. Clarkson of the Western Pennsylvania Safety Council represented the National Safety Council. Francis Feehan, who in 1931 spoke at the presentation of the Joseph A. Holmes certificate to Universal plant, represented the United States Bureau of Mines. Paul C. VanZandt, vice-president in charge of operations, and Gordon C. Huth, safety director, of Universal Atlas Cement Co., were also present at the ceremony.

Superintendent R. L. Slocum and members of his safety committee, which is headed by J. R. Cline, assistant superintendent, were

showered with congratulations on the unusual record they had achieved.

After the ceremonies refreshments were served to the crowd of nearly 1000, the remainder of the afternoon being devoted to soft ball, other games, and competitions.

Duluth Commemorates Another Safe Year

The Duluth, Minn., plant of the Universal Atlas Cement Co., which has had seven accident-free years of operation since January 1, 1923, celebrated the fourth reward of its Association trophy on July 18. Paul C. Van Zandt, vice-president of the company, made the principal address. Other speakers included John Ahnfelt, operating manager, O. J. Lindahl, general auditor, and J. H. Kemper, general superintendent of Buffington, Ind., plant. Six hundred persons attended. Picnic supper was served following the program. A two-hour program of sports concluded the celebration.

Tampa Plant Has Big Party

On June 30, there was also a very interesting trophy dedication at the plant of the Florida Portland Cement Co. at Hooker's Point, near Tampa. In addition to the large group of distinguished local citizens who were present, a number of guests from New York, Chicago and Chattanooga and Dallas attended. A fine barbecue lunch was served from stands on the plant grounds after which an interesting program was given, Vice-President F. M. Traynor acting as chairman. The program included music and a "Safety Play."

Following the program a reception was held for visiting guests at Hotel Tampa Terrace.

Rededicate at Nazareth

The Portland Cement Association safety trophy won by the plant of the Lone Star Cement Co., Pennsylvania, a few years ago was rededicated at Nazareth on July 6, commemorating another year of accident-free operation in 1933. The affair was in charge of Superintendent E. C. Champion and the plant safety committee. G. C. Britton, district engineer at Philadelphia, represented the Association.

Great Lakes Goes to Canada to Celebrate

In honor of its third year of accident-free



First-aid demonstration, part of trophy dedication ceremonies at Prospect Hill plant of Missouri Portland Cement Co.

operation, workmen and officials of the Great Lakes Portland Cement Corp., with their families and friends, gathered at the plant on July 12 to rededicate their trophy. Approximately 700 persons attended.

Program Concluded at Ontario Resort

On conclusion of the program at the plant the entire party boarded buses for the Commercial Street docks, where the steamer Canadiana had been chartered for the trip to Crystal Beach, Ont. After picnic lunch there was a program of competitions at the Crystal Beach stadium and free rides on the concessions at the Beach, as well as other entertainment.

Crushed Stone

Kansas City Crushed Stone Co., Kansas City, Mo., is the name of the reorganized Consumers Material Corp., which has been in bankruptcy for several years. The reorganization committee, consisting of R. Newton McDowell, former president of the Consumers corporation, and John Prince, president of the Stewart Sand and Material Co., recently purchased the property at a public sale in the interests of the plan of reorganization. Approximately 95% of all creditors, based on their relative participation, came under the plan advanced by the committee.

Basalt Rock Co., Healdsburg, Calif., has completed installation of a "black-top" plant for preparing ready-mixed asphalt aggregates for road work. The new plant was described by A. G. Streblov, president of the company, to a local newspaper man as follows: Concrete bins have been constructed in which are placed the various aggregates which go to make up the component parts of the mixture. In the first two bins are coarse crushed rock; the second two contain crushed rock of a finer grade and still another pair hold a still finer grade. In a separate hopper is the fine sand which also goes into the finished product. All of the aggregates are conveyed by belt, in proper proportions, to a dryer-mixer, where the material is thoroughly mixed and heated to a temperature of between 225 and 250 deg., from which it is conveyed by a bucket elevator to the top of the plant, where it is screened and separated into the various sizes, and placed in separate bins. Meanwhile, the asphalt has been heated to approximately the same temperature, between 225 and 250 deg., and the material is weighed into a mixer, a certain number of pounds of each material, rock and sand as well as asphalt, where it is thoroughly mixed, hot, dropped onto another belt which loads the finished product into cars for transportation.



Safety trophy dedication in progress at Plant No. 2 of the Pennsylvania-Dixie Cement Corp., Clinchfield, Ga.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of July 14:

New England

33211. **Lime, agricultural**, having no value for chemical or building purposes; **lime-stone**, crushed or ground, in straight or mixed, C. L., minimum weight 60,000 lb., from Brandon, Cavendish, Leicester Jct., West Rutland, Middlebury and New Haven, Vt., to various points in Maine on the Aroostook Valley R. R., Bangor & Aroostook R. R. and Canadian Pacific Ry. (Exhibit showing present and proposed rates will be furnished upon request.) Reason: Proposed rates are on basis of 10c per 100 lb. higher than present rates in effect from Rockland, Me., to same destinations.

33234. **Stone**, coated, crushed in bulk, in gondola or other open top cars, C. L., (See Note 2), from Westfield, Mass. (ex B. & A. R. R.).

To	*Pres.	†Prop.
Harlem River, N. Y.	100	100
Woodlawn, N. Y.	100	100
White Plains, N. Y.	115	115
Brewster, N. Y.	115	115
Manchester Bridge, N. Y.	120	125
Poughkeepsie, N. Y.	120	120

Rates in cents per net ton. Reason: To place Westfield on a comparable basis with other producing points.

*Plus 50c per ton for B. & A. switching charge.

†Includes switching charge of B. & A. R. R. not to exceed 25c per ton.

33240. To extend the expiration date shown in connection with the carload commodity rates on **agricultural lime** and broken and ground unburnt **limestone**, from Rockland, Thomaston and Warren, Me., to stations in Maine on the Aroostook Valley R. R., Bangor & Aroostook R. R. and Canadian Pacific Ry., published in Maine Central R. R., M. F. U. C. 2264 and Items 175-D and 196-D of Maine Central R. R., I. C. C. C-4288, from June 30, 1934, to December 31, 1934. Reason: To extend the application of these rates until December 31, 1934.

Trunk

32538. (A) **Stone, natural** (other than bituminous asphalt rock), crushed, C. L., (B) **stone, natural** (other than bituminous asphalt rock), crushed, coated with oil, tar or asphaltum, C. L. (See Note.)

Note: The weight of the oil, tar and/or asphaltum not to exceed 10 per cent by weight of the commodity as shipped, the shipper to so certify on bills of lading and shipping orders.

(See Note 2), from Bowmansville, Akron, Gasport, Stafford and LeRoy, N. Y., to Athol Springs, Dunkirk, N. Y., Erie, Penn., Ashtabula, Painesville, O., Fredonia, Falconer, N. Y., Warren, Garland, Titusville, Penn., and various, (A) rates ranging from 70c to \$1.40, (B) rates ranging from \$1.23 to \$1.55 per net ton. Reason: Proposed rates are fairly comparable with rates from Buffalo, N. Y.

Sup. 1 to 32495. **Crushed stone** (will not include agricultural limestone or ground limestone, unburnt; or fluxing stone or fire stone) and **screenings**, C. L., (See Note 2), from Havre-de-Grace, Md., to Quenonco, Md., Snow Hill to Scarborough, Md., incl.; Westover to Oil Siding, Md., incl.; Costen to Leno, Va., incl., and Ocean City to St. Martins, Md., incl., \$1.60 per net ton.

32548. **Limestone** (finely ground), C. L., minimum weight 50,000 lbs., from Annville, Penn., to Smyrna, Del., 10c per 100 lb. Present rate 18c per 100 lb. Reason: Proposed rate is comparable with rate from the Bainbridge district.

32549. **Sand, blast, engine, moulding, foundry, glass, silica, quartz or silice**, C. L., (See Note 2), from Honey Brook and Narvon, Penn., to Rutherford N. J., \$2.52 per net ton. Present rate 6th class. Reason: Proposed rate is comparable with rate from Philadelphia, Penn., and Millville, N. J.

32556. **Stone, natural** (other than bituminous asphalt rock), crushed, coated with oil, tar or asphaltum, C. L. (See Note).

Note: The weight of the oil, tar and/or asphaltum not to exceed 10 per cent by weight of the commodity as shipped, the shipper to so certify on shipping orders and bills of lading.

(See Note 2) from Haverstraw, N. Y., to N. Y. O. & W. Ry. stations Firthcliffe, Simmutville, Wurtsboro, Ferndale, Colchester, N. Y., and various, rates ranging from 98c to \$1.64 per net ton. Reason: Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

32557. **Soapstone**, ground or pulverized, testing less than 99 per cent through 200 mesh screen, C. L., minimum weight 70,000 lb., from Marriottsville, Md.,

To	Proposed
Buffalo, N. Y.	19c
North Tonawanda, N. Y.	19
Manville, N. J.	13
Bound Brook, N. J.	13
Albany, N. Y.	19
Philadelphia, Pa.	12
Bayonne, N. J.	14
Jersey City, N. J.	14
Genasco, N. J.	14
Garwood, N. J.	14
Putherford, N. J.	14
Maurer, N. J.	14

Rates in cents per 100 lb. Reason: Proposed rates are fairly comparable with rates from Schuyler, Va.

32568. **Crushed stone**, coated with tar, oil, asphaltum or similar bituminous materials (See Note), C. L., (See Note 2).

Note: The oil, tar, and/or asphaltum not to exceed 10 per cent by weight of the commodity as shipped, the shipper to so certify on shipping orders and bills of lading. From Martinsburg, W. Va., to Lockport, N. Y., \$3.15 per net ton. Present rate 6th class. Reason: Proposed rate is comparable with rate to Akron, N. Y.

32570. The Erie Railroad proposes to cancel commodity rates on **sand and gravel, crushed stone and slag** (the refuse from chrome or manganese ore) which is without commercial value for further extraction of metal, in open top equipment, C. L., from the following origin points, as published in Erie R. R. I. C. C. 19132 to points on Erie R. R., B. & H. R. R., N. J. & N. Y. R. R., N. Y. S. & W. R. R. and W. & E. R. R. and Erie R. R. I. C. C. 18482 to connecting lines in Trunk Line territory:

Erie R. R. I. C. C. 19132—Hewitt, N. J., Pepew, N. Y., Niagara Falls, N. Y., Suspension Bridge, N. Y., Edgewater, N. J., Langdon, Penn., Moosic, Penn., Plains, Penn.

Erie R. R. I. C. C. 18482—Edgewater, N. J. Reason: Investigation develops no traffic has moved for some time and no prospect of future movement, therefore, rates are obsolete.

32574. To cancel all commodity rates on **lime, agricultural; lime, burnt or unburnt, carload, oyster shells**, C. L., also fertilizer, less than C. L., from Alexandria, Va., to destinations in the states of Maryland and Virginia, also District of Columbia. Class rates to apply. Reason: Investigation develops no traffic has moved for some time nor is there prospects for future shipments therefore rates are obsolete.

32623. To cancel present commodity rates on **gravel, sand** (other than blast, core, engine, fire, foundry, glass, moulding, quartz, silice or silica); **sand, blast, core, engine, fire, foundry, glass, moulding, quartz, silice or silica; stone**, crushed; **stone screenings; ashes and cinders**, coal; slag, crude, granulated, crushed or commercial, from Johnstown, Bessemer, Duquesne, Freeport, Verona, Penn., Machias, Cuylerville, Irvine, Mills, Dunkirk, Bladell, N. Y., Mahoning, Haleton, South Duquesne, West Winfield, Penn., and various to all destinations as per P. R. R. Tariffs I. C. C. 244, 1067 and 184. Reason: Investigation develops that there is no longer a movement of the commodities from the origin points involved and no contemplated movement, therefore, same are obsolete.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

32625. **Sand, viz., engine, moulding, ground flint, quartz and silice**, in straight or mixed C. L., (See Note 2), from Mapleton District, Penn., to St. Charles, Penn., \$2.10 per net ton. Present rate, \$2.52 per net ton. Reason: Proposed rate is fairly comparable with rate on moulding sand from Berkeley Springs District.

32627 (increase) (carrier)—Cancel all commodity rates on **sand and gravel**, C. L., from Ithaca, Williamsville, Cheektowaga, Swartwood, Sylvan Beach, Victor, Niagara Falls, Horseheads, South Bay, North Fair Haven and Ludlowville, N. Y., to various, classification basis to apply. Reason: Investigation develops no traffic has moved for some time and no prospect for future movement, therefore, rates are obsolete.

32523. (A) **Sand and gravel** (other than blast, engine, foundry, moulding, glass, silica, quartz, or silice), in open top cars, C. L. (B) **Crushed stone**, in open top cars, C. L., (See Note 3).

To	Prop. (A)	Prop. (B)
Hightstown, N. J.	90	100
Sharon, N. J.	90	100
Imlaystown, N. J.	100	110
Shrewsbury, N. J.	100	110
Davis, N. J.	100	110
Cream Ridge, N. J.	100	110
Hornertown, N. J.	100	100
New Egypt, N. J.	100	110
Cookstown, N. J.	100	110
Wrightstown, N. J.	100	110
Camp Dix, N. J.	*100	...
Pemberton, N. J.	90	...

To	Prop. (A)	Prop. (B)
Hightstown, N. J.	90	100
Sharon, N. J.	90	100
Imlaystown, N. J.	100	110
Shrewsbury, N. J.	100	110
Davis, N. J.	100	110
Cream Ridge, N. J.	100	110
Hornertown, N. J.	100	100
New Egypt, N. J.	100	110
Cookstown, N. J.	100	110
Wrightstown, N. J.	100	110
Camp Dix, N. J.	100	80
Pemberton, N. J.	110	80

*To apply only on sand and gravel, C. L.

The above rates in cs per 2,000 lb. Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

32531. **Stone, natural** (other than bituminous asphalt rock), crushed, C. L., (See Note 2). Rates in cs per 2,000 lb.

To	Proposed
Ia Salle, N. Y.	75
Echota, N. Y.	75
Niagara Falls, N. Y.	75
Suspension Bridge, N. Y.	75
Beach Ridge, N. Y.	75
Mapleton, N. Y.	75
Lockport, N. Y.	75
Cambria, N. Y.	83
Sanborn, N. Y.	83

Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions within the same general territory.

32578. **Sand, blast, engine, foundry, moulding, glass, silica, quartz or silice**, C. L., (See Note 2), from Lewes, Del., to Red Lion, Penn., \$2.60 per net ton. Present rate 6th class. Reason: Proposed rate is comparable with rates to York, Penn., Westminster and Keymar, Md.

32584. **Sand**, C. L., (See Note 2), from Williamstown Jct., N. J., to Florence, N. J., \$1.10 per net ton. Present rate, \$1.25 per net ton. Reason: Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

32585. **Crushed stone**, C. L., (See Note 2), from Security, Mo., to Alexandria, Va., \$1.15 per net ton. Present rate, \$1.40 per net ton. Reason: Proposed rate is comparable with rate from Martinsburg, W. Va.

32487. **Ground limestone**, C. L., minimum weight 50,000 lb., from Annville, Mverstown, Palmyra and Swatara, Penn., to Hockessin and Carrcroft, Del., 10c per 100 lb. Reason: Proposed rate is comparable with rate from York-Bainbridge district.

32591. **Limestone**, ground or pulverized, and **limestone dust**, C. L., minimum weight 50,000 lb., to stations on the Genesee and

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Old Company Building New Plant

Since it is not often that a new lime plant is built, particularly by old established concerns with a string of old plants, this undertaking on the part of the "old enough to be venerable" Glencoe Lime and Cement Co., St. Louis, is of interest. As all will recollect this concern was presided over for many years by the roaring, but harmless and much beloved lion of the lime industry, Col. C. W. S. Cobb. It was the first or anyway close to first lime company that applied gas producers to lime kilns. In view of what they now are doing this concern appears to refuse to be satisfied with merely being one of the oldest, but wants also to be one of the most progressive.

The new kilns will be natural gas-fired, with this gas so applied that its inherent advantages will be realized. The kiln will be equipped with numerous metering burners, not only as conventionally, on sides of shaft, but in the end and even in the center of the shaft. This center burner application is particularly interesting. It has been tried and has proven entirely practicable. It is a novel departure that may make construction of vertical spall kilns possible.

The kilns will be of the induced-forced draft type, will have a superimposed rock storage chamber and a forced draft cooler. The burners are designed for high and low pressure application of natural gas and for individual metering of both air and gas to facilitate regulation. The designs call also for arrangements permitting quick change from natural gas to producer gas firing, whenever and if that becomes necessary.

Gus H. F. Johannes, the new president of Glencoe, is proving a worthy successor to E. S. Healey and Col. Cobb, his predecessors in office.

A Word From Far North

A letter was received from D. C. Henderson, manager of the Moosehorn Lime Co., Moosehorn, Manitoba. The letter in part reads: "We would like to give you a resumé of our production results during the last run using screened stove size American gas coal, our fuel ratio for the run was 5.5 tons of lime per ton of coal."

This is a good ratio for high calcium limestone. At one time his average ratio was 3.73; so the improvement is considerable, and as the coal costs \$10 a ton (and likely more now), efforts at fuel economy pay better than in our American lime plants.

Making Natural Gas Do Mechanical Work

Natural gas is distributed at rather high pressures and the Ash Grove Lime and Portland Cement Co., at its Galloway, Mo., lime plant, makes practical use of this stored energy. The natural gas on the way into the kiln passes through a form of injector which draws kiln gases from upper kiln portions. In this way flame intensity is tempered without having to resort to the use of a fan.

A Word From Roumania

Dr. Zoltan Kertesz Dipl. Ing. of Turda (which before the war was in Hungary, but now is in Roumania) sent me a 72-page booklet dealing with a mathematical analysis of the combustion process and heat losses encountered with cement and lime kilns. While applicable to all fuel, it refers particularly to instances where natural gas is used as fuel. Dr. Kertesz has had much experience with natural gas, and in his region it has been used for over 30 years. He has written many papers on the subject and some penetrated to me many years ago. In view

of this I called on Dr. Kertesz while on my last trip to Europe and have learned much of interest in this old gas-burning region.

Dr. Kertesz suggested that I translate the pamphlet into English, but due to its mathematical nature, it would be a winter's job, and otherwise purely a labor of love. Those who are still masters of their school German can, however, obtain copies from Verlag Von Wilhelm Knapp Halle (Saale), Germany.

Induced Draft Operation of Lime Kilns

When lime kilns are operated under induced draft it often is forgotten that fan capacity varies with gas temperature. After charging the kiln with rock the gases are cool, and the fan may handle from two to three times the weight of gas that it can after the kiln top heats up. If the draft is not regulated, and it often is not, then at one time of the day the kiln will get too much air and be inefficient; at another time of the day after rock heats up it will get too little air, incomplete combustion will result and conditions again will be inefficient.

Study of the three charts herewith given should prove instructive. The first gives the relation of fan suction to gas temperature at the fan. The higher is the gas temperature, the lower is the fan suction, and with this continuing through the night fan suction would be indeed feeble.

The second chart shows the effect of this. While during the early hours after the kiln was charged, at first, there was too much air induced for the amount of natural gas sent to the kiln, as the temperature raised there was a continuous reduction until in the afternoon there was no oxygen found in the kiln waste gas. After this carbon monoxide soon appeared and continued to increase until in the morning when the kiln top was



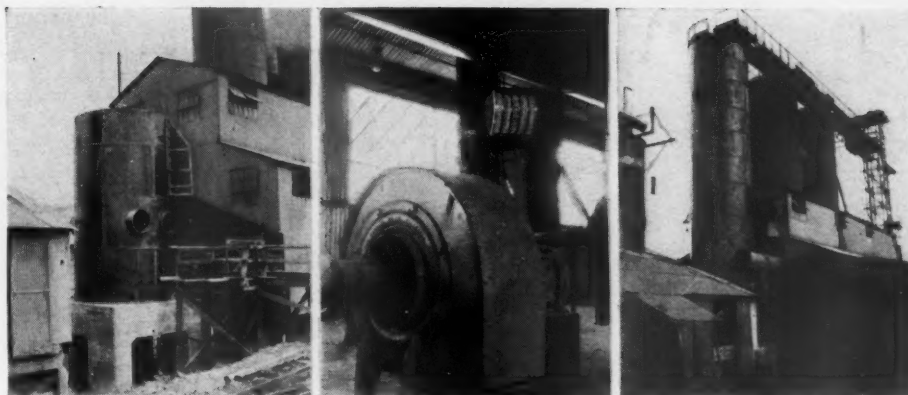
Left: Top of gas producer in operation at new lime plant of National Carbide Co., Ivanhoe, Va. Spare producer is in background. One inspection hole may be seen in the producer at right. Center: The company's old and new lime plants. Capacity of new plant is 50 tons of lime per kiln with the fuel ratio of 5 to 1. Note increased kiln height in new plant. Right: Gas producer bottom and blast fan. Note connection for adding small percentage of CO₂ to the blast, which eliminates use of steam. No steam is used in starting up the producer. Cross connections allow change from one blast fan to the other. (Illustration on page 56 of the July issue was erroneously identified with the National Carbide Co. It was a view of the Louisiana Lime Products Corp. plant, Easton, La., description of which will follow in a later issue)

at the hottest, it must have amounted to 4% or 5%, which represent a quite substantial loss of heat.

The curve of the third chart shows the temperature of gas at the fan after both morning and afternoon charging. These temperatures are, however, much lower than actual temperatures of gas coming up through the kiln, because in this case, as also ordinarily, the kiln gases are diluted by the cold air rushing downward through leaky kiln tops. Actual waste gas temperatures from some lime kilns may vary anywhere from 150 deg. F. to 1200 deg. F.—the higher temperature right before, and lower right after, the morning charging.

A kiln fan must be large enough to give ample suction when gas is at the hottest. Then each kiln must be equipped with a readily controllable damper and a suitable pointer draft gauge. Then the fireman should adjust the draft regulators at least once an hour and so try to maintain a constant draft through most of the day.

Frequent charging of the kiln is also conducive to more constant temperatures. Once or twice a day is just not enough, if kiln output rate is high. At some few plants they



Left: Kiln "C" being erected almost exactly in all respects as kiln A and B of the new lime plant of National Carbide Co., Ivanhoe, Va. Center: Kiln blast fan with CO₂ connection and draft gauge board. Provision is made for admitting CO₂ to the kiln blast to temper flame when necessary. Draft gauges show draft at kiln top and at eyes as well as draft at fan. Right: Kiln "C" almost completed, ready for lining, fan placement and building extension

charge fresh rock after every draw day and a gas temperature variation, and so fan draft fluctuation, and dampers and draft gauges still are needed.

Lime Kiln Insulation

One often wonders why lime kilns are so inefficient, why from one-third to two-thirds of heat applied is wasted, where is this heat going to anyway. A quite serious loss is that of radiation and convection from the kiln walls.

It may be said that for every exposed square foot of kiln shell in the calcining region, if uninsulated, there is a loss of half a pound of lime in fuel equivalent as well as in capacity. If the calcining zone shell extent is 800 sq. ft. the loss is 4 tons of lime per day. By insulation this can be cut down to about 1.5 tons per day.

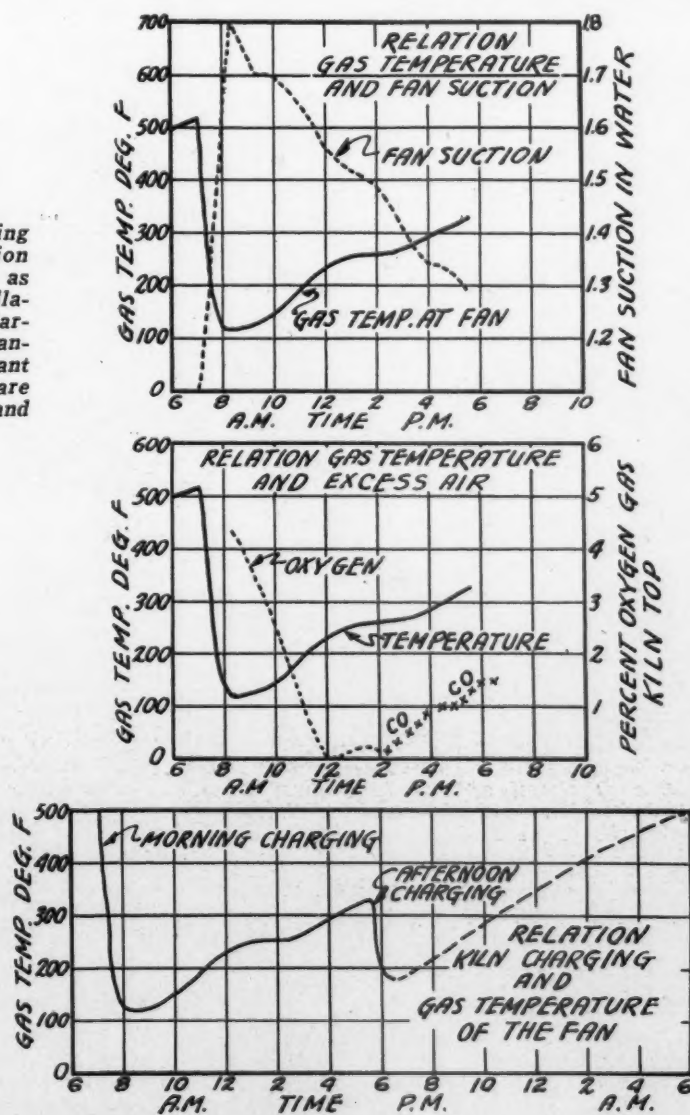
Insulation saves heat, increases capacity, reduces investment charge, also operating and proportionate repair charges, but how much is almost unbelievable. If one traces the matter through the many ramifications it becomes evident that a saving of \$15,000 takes place in 20 years for an initial investment of only about \$750 for insulation.

Lime Rates to Change

BY SEPTEMBER 26, carriers must put into effect new rates on lime between southwestern points in accordance with an order of Division 5 of the Interstate Commerce Commission.

The new order follows the I. C. C. decision of a year ago this June. The new order calls for revised carload rates on lime between all producing points embraced in the schedules mentioned in the decision in southwestern territory and southern Missouri, as those territories are defined in Consolidated Southwestern cases and in Ohio, Alabama, Tennessee and northern Missouri, as also between Quincy and Marblehead, Ill., on the one hand, and all destinations embraced in schedules under suspension in these proceedings in southwestern territory and southern Missouri on the other. Rates to points in the Texas-Oklahoma differential territory also are involved.

Chart (top) showing relation of fan suction to gas temperature as recorded in installation at National Carbide Co. plant, Ivanhoe, Va. Resultant temperature charts are shown in center and below



Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Concrete-Block Ashlar: Beauty and Utility

ARCHITECTS of the recently completed Midway Theatre, East Dearborn, Mich., specified cinder block after two considerations: Appearance of this moving picture house had to compete with the finest in Detroit. Because the structure was to serve as a talking picture auditorium, acoustical qualities of the interior finish were of paramount importance.

E. Straight, of the architectural firm of Bennett and Straight, describes the result in detail. "We are pleased to report," he says, "perfect results through the use of cinder block interior walls.

"This point deserves most favorable comment in view of the fact that we substituted gypsum plaster ceilings for special acoustically treated ceilings after the project was under construction, thereby effecting a substantial saving in cost to the owners. . . . Remarkable results were obtained in the decoration of the walls without impairing the acoustic value of the blocks."

Below: Interior of Midway Theatre. Random ashlar effect was gained by skillful painting of coursed ashlar



As the illustrations show, a random ashlar effect was obtained by a skillful use of coursed ashlar units toned with different paints.

Einar Christensen, president of the National Cinder Concrete Products Association,

commenting on the use of ashlar in theatres, refers to "convincing data on sound absorption" obtained at the Bell Telephone Laboratories on exposed as well as painted cinder units. "The remarkable thing is," he declares, "that by using a 'common masonry' like cinder units, there is no need of expensive acoustical treatments. Applications of costly and uncertain plasters are obviated; draperies and heavy rugs are not needed. That may mean the saving of thousands of dollars on a job such as a moving picture theatre."

Seeing unequalled opportunity in concrete ashlar, Les Schwalbe, president, Economy Concrete Products Co., Wauwatosa, Wis., is going ahead in his thorough way to make builders in the Milwaukee territory appreciative of this advanced method of building.



Above: Detail of wall in Midway Theatre in suburb of Detroit, Mich., showing use of ashlar units

First job was to whip up production. With an Anchor machine he found it simple to make a wide variety of sizes—far more sizes in fact than necessary or desirable. He decided to limit production to 4 and 8-in. faces and 4, 8, 12 and 16-in. lengths. To make all these sizes the only equipment necessary, in addition to that for regular 16-in. lengths, was:

1. Longer pallet pins.
2. A split core.
3. Two dividing plates.

By substituting the split core and dividing plate for an end or center core, 4 and 12 or 8-in. units are made. Pallet pins of accurate lengths have proved a satisfactory way to get the 4-in. face.



Never satisfied, Schwalbe is always trying something new. Here he holds his latest type of partition unit, which can be broken into as many as nine different lengths. Also, it can be halved to make a furring tile. Note surface texture

With production of the necessary sizes solved, the second production problem was to get a good texture. This was solved by varying the water and cement content. After some experimenting this too has been solved. Mr. Schwalbe knew it was useless to try to sell without samples. First he experimented with different colors of paint on single units. Then he built a number of patterns (without mortar) in a corner of his plant. Here he got first hand knowledge of the ease of laying the different patterns. Next he built sample display panels in his office, and painted them to show how attractive walls can be made.

Rock Products News Briefs

Contracts Let—Bids Received

Pittsburgh, Penn.: Public works director and supplies director again "worked up" because of identical bids on ready-mixed concrete. Some weeks ago eight firms submitted bids in which the price of concrete for the six delivery zones into which Pittsburgh is divided all ranged from \$8 per cu. yd. to \$9.15. When the supplies director questioned the uniformity of the prices, he was informed that NRA regulations were responsible. He consulted the law department, which ruled that the NRA was not a legal excuse for firms "getting together" on their bidding. Consequently new estimates asked. When the second batch of bids were opened, prices again were identical. This time the costs ranged from \$7.75 to \$8.90, or 25 cents less a cubic yard. The city authorities are now threatening to build their own ready-mixed concrete plant.

Appleton, Wis.: Contract let to Frank Murphy, only bidder, for 2,000 cu. yd. of crushed gravel at \$1.09 per cu. yd.

Syracuse, N. Y.: County highway department twice rejected bids for 786 tons of sand (see *Rock Products*, July, 1934, p. 31); third bids opened were from 25c to \$1.51 per ton lower than those previously received and varied from \$1.35 to \$1.89 per ton as against the \$1.75 to \$3 per ton previously offered. The Solvay Sales Corp. offered stone screenings, the use of which was made optional in the specifications, and was low bidder on one road and was tied for low on several others. S. F. Clough & Sons were low on two bids and tied for another; W. F. Saunders was tied for low on eight proposals; B. D. Hyde was low on three, and O. R. Westfall was low on eight.

Sandusky, Ohio: Three uniform bids received for water-works lime, however, Kelley Island Lime and Transport Co. evaluated by the city chemist on a calcium oxide content basis figured \$8.10 per ton; Louisville Cement Co., \$8.86; Marble Cliff Quarries Co., \$8.85. Acceptance of Kelley Island Lime and Transport Co. bid was recommended by the chemist, but the city commissioners weren't sure how to proceed.

Janesville, Wis.: R. T. Glassco, county agent, and Frank Byrne, county works secretary, announced that agricultural limestone will be available to farmers in Rock county at a cost of less than 20c per ton in some sections of the county. Final arrangements have been completed for the carrying on of the limestone pulverizing projects under the FERA, and a project in Clinton township is expected to get underway soon.

Crushed Stone

France Stone Co., Toledo, Ohio. has purchased the Higgins Stone Co., Bellevue, Ohio; properties include five quarries in York Township, Sandusky County; one quarry in Thomson Township, Seneca County, and one at Bellevue. The Higgins company was organized here in 1908 by the late Dr. F. A. Higgins, local dentist. Some time afterward Dr. Higgins sold his interests to J. A. Moore, now also deceased, whose widow has continued as president of the company in association with John W. Goudy as vice-president and W. A. Buchanan, secretary and treasurer.

Eldred Crushed Stone Co., Jerseyville, Ill., and other small crushed-stone companies in Illinois were denied their petition to NRA for exemption from the labor provisions of the Code for the Crushed Stone, Sand and Gravel, and Slag Industries. H. H. Armstrong, president of the Eldred company, is quoted by the *Jerseyville Democrat* in part as follows: "The code was written by the big shots of the stone production game, is being operated by the same group, and there is nothing we can do about it but operate under violation of the code regulations or close our plants. I consider Assistant Deputy Administrator Plimpton is mistaken in his ruling. We are to produce stone 10% above the prime cost. That is where the big shot operator has it on the small one. The former employs a small amount of labor in the production of his products and does not have to take into consideration the depreciation or cost of his labor-saving devices. He figures on the actual amount of labor employed, his royalty on stone, costs of power and explosives, the same as we who use a far greater quantity of labor in the hand production game."

George Hoffstetter, president of the Staunton Tie and Lumber Co., which operates a small quarry at Jerseyville, is quoted in part as follows: "I have been paying my men from 20 to 27c an hour in hand labor production of limestone. My production costs are as follows: The average cost of production for the year 1933 based on 20c. labor was as follows, per ton: average cost of production, \$1.806; average sale price delivered \$1.90; profit 9.4c.; costs, proposed scale of 40c. per hour, per ton \$2.38; loss per ton 49c.; loss 25.8%; operating costs of production during the year 1934, average cost of production based on 20c. labor, per ton \$1.76; average sale price, delivered, per ton, \$1.94; profits per ton 18c., profit 9.2%; average cost at 40c per hour \$2.655; loss per ton 75.6c.; loss 38.9%. During the past few weeks, we have been compelled to lower our prices to meet competition of a large machine operated quarry. This was made

necessary by our competitor delivering lime dust into our territory for as low as \$1.35 and \$1.40 per ton, hauling it 15 to 25 miles. We had occasion to buy some limestone dust from this party and were charged \$1.25 per ton at the plant."

Assistant Deputy Administrator R. E. Plimpton in his decision said: "Code wage increases place an undue burden on hand labor plants, certain of the petitioners say, a burden not proportionately shared by plants employing a larger proportion of skilled labor. The Code Authority maintains, however, that 'hand operated plants are better able to adjust their operations in the light of code requirements than is true in the case of the machine operated plants, forced as they are to meet the inescapable charges growing out of the heavy investments in machinery and equipment which was designed for conditions of past years when demand was far in excess of present requirements.' The petitioners failed to show that the code provisions were discriminatory. If there is destructive competition in the industry, the code provides what is intended to be a remedy, in its prohibition against selling below prime plant cost plus 10%. This is the remedy that should be involved, if any producer is competing unfairly. Labor should not be used as a crutch to prop up uneconomical or inefficient producers, nor to enable any producers to secure profits and volume in an industry where both have been conspicuously absent in recent years."

Sand-Lime Brick Production and Shipments in June, 1934

THE following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Nine sand-lime brick plants reported for the month of June, this number being one more than the number reporting for the month of May, 1934, statistics for which were published in July:

Average Prices for June

Shipping point	Plant price	Delivered
Grand Rapids, Mich.	\$.....	\$12.00
Syracuse, N. Y.	14.00	16.00-20.00
Mishawaka, Ind.	8.50	.....
Dayton, Ohio.	13.00	15.00
Saginaw, Mich.	11.00	.....
Detroit, Mich. ....	.....	11.50
Toronto, Ont., Can.	12.00	13.50

Statistics for May and June

	†May	*June
Production	1,340,150	1,227,925
Shipments (rail)	59,500	44,000
Shipments (truck) ..	1,345,712	964,592
Stocks on hand	1,323,693	1,434,381
Unfilled orders	605,000	425,000
†Eight plants reporting; incomplete, four not reporting unfilled orders.		
*Nine plants reporting; incomplete, five not reporting unfilled orders.		

Progress in Rock Products Specifications

Report of the Annual Meeting, American Society for Testing Materials

By P. J. Freeman,

Principal Materials Engineer, Tennessee Valley Authority, Knoxville, Tenn.

THE 37th annual meeting of the American Society for Testing Materials, at Atlantic City, N. J., on June 25 to 29, had a registered attendance of 823, which represents neither the high nor the low mark for attendance during recent years and may therefore indicate a measure of the industrial recovery. There were the customary 15 regular sessions and then in addition the very active committee meetings which seem to become increasingly active at each succeeding June meeting.

Report of Cement Committee

Committee on Cement C-1.—P. H. Bates, chairman, presented a very substantial and excellent report which should be followed up by all who are interested in the development of a cement having a moderate heat of hydration and at the same time have a cement high in resistance to the action of water containing sulfate salt.

Sulfate Resistant Portland Cement

As a result of deep concern and work, particularly on the part of the producing members, two cement specifications were presented at the March meeting of Committee C-1—one covered a low heat of hydration cement, and the other a cement having a moderately low heat of hydration and intended to resist active sulfate solutions such as sea water, or the white alkali salts so common in some parts of the United States.

The very low heat cement such as that which is being used at Boulder dam was discussed in the committee report, but is subject to further study, as such cements are suitable only for very large construction projects.

The other type of cement which is officially labeled "sulfate resistant portland cement," but which is frequently called "modified portland cement," or "moderate heat portland cement" was the cause of a great deal of interest at several committee meetings, both in March and in June. Cements developing a moderately low heat of hydration are of special interest at this time due to the fact that the Tennessee Valley Authority has purchased a considerable quantity of such cement for the construction of the Norris and Wheeler dams. The chemical specifications for this moderate heat cement known as Tennessee Valley Authority Type B calls for the following limits:

Tricalcium silicate ($3\text{CaO} \cdot \text{SiO}_2$).....
Not less than 35 nor more than 55%
 Tricalcium aluminate ($3\text{CaO} \cdot \text{Al}_2\text{O}_3$).....
Not more than 8%

The experience of six mills making Type B cement to comply with strict chemical requirements has not developed any serious difficulty in manufacture which might not be encountered in making ordinary cement. It is the writer's prediction that since several mills are making a sulfate resistant cement for the Tennessee Valley Authority that when the new tentative specifications of the American Society for Testing Materials have been finally adopted there will be many users among engineers who are building structures where sulfate resistance is desired in combination with a moderately low heat of hydration.

The soundness of sulfate resistant cement is determined by the ordinary steaming test, but that does not appear to be severe enough to satisfy either the manufacturers or the users for demonstrating the durability of the cement if it is to be used in concrete subjected to sulfate waters. An additional test is to be added for such cements which will be similar to that proposed by Merri-man for the Fort Peck project.

A pat of neat cement shall remain firm and hard and show no signs of distortion or disintegration when exposed for 28 days to the sodium sulfate test for soundness which is to be made as follows:

1. One hundred (100) gm. of cement and 41 ml of water shall be placed in a beaker and stirred briskly with a spatula for one minute. Steel balls, 3/16 in. diameter, shall be placed three to a side along the two edges of a thin 5x7 in. glass plate. The balls may be held in place by means of shavings of paraffin. The cement shall be poured on the glass plate and a second glass plate shall be lowered over the mass until it comes in contact with the steel balls in such a manner as to spread the paste without the inclusion of air bubbles. Care must be taken to prevent undue bending of the glass plate. The light weight (two soundness pat glasses are sufficient) shall be placed on the upper plate.

2. The assembly shall be placed in the moist room for 24 hours and then in water for 24 hours. The specimens shall then be removed from the glass plates by slightly bending the glass, sawed to size (2x4 in.) and immediately immersed in water for an additional 24 hours.

3. A solution shall be made by dissolving 150 gm. of C. P. anhydrous sodium sulfate in 1500 ml of distilled water. This solution shall be placed in a 2 qt. jar equipped with a rubber gasket and tight cover. The specimen shall be suspended in this solution within the jar by means of a copper wire drawn through a hole drilled near one end of the specimen. The jar shall be kept sealed except during neutralization of the solution.

4. The solution shall be neutralized every 24 hours by the addition of sulfuric acid. Phenolphthalein shall be used as an indicator. During the first few days 20N acid

may be used and during the later periods 6N acid may be used. The amount of acid added each day should be tabulated since an increase in the amount of acid required serves as an indication of failure of the specimen.

5. The temperature of the room, dry cement and sodium sulfate solution shall be maintained at not less than 20° C. (68° F.) and not more than 27.5° C. (81.5° F.). The temperature of the mixing water, moist closet and water in the storage tank shall not vary from 21° C. (70° F.) by more than 1.7° C. (3° F.).

A compressive strength of 750 lb. per sq. in. at three days and 1,500 lb. at seven days for a plastic mortar cube also represents new standards for use with this type of cement.

Specific surface with a minimum requirement of 1,500 sq. cm. per gram is a new type of specification for determining the fineness and grading of the cement particles.

The very low heat cements might, of course, also be classed as sulfate resistant cements, but due to the fact that such cements are so slow in obtaining complete hydration they are unsuitable for ordinary construction. The average engineer will be interested only in a cement which will set in approximately the same time as that required for regular portland cement.

Plastic Mortar and Proposed New Methods of Test

A very comprehensive report on plastic mortar tests of cement by O. L. Moore, chairman, presented a vast amount of data covering various types of testing machines and different kinds of specimens. This investigation began about five years ago and regardless of specific conclusions developed by the investigation, Committee C-1, has now gone on record as proposing a mortar strength method using 2-in. cubes with a graded Ottawa sand, which is a departure from the present standard method of testing cement.

This proposed method of test was revised to a considerable extent from the form in which it was printed in the report of Committee C-1, but the general outline remains the same.

The specimens are to be moulded somewhat wetter than customary and the results of the tests may or may not more nearly represent the true strength of the concrete to be obtained with a cement, but at least there will be an opportunity for finding out the relation, if any, in connection with the specifications for sulfate resistant cement, which has definitely abandoned the use of

tension tests and will require all tests to be made under the new tentative method as outlined in the committee report presented before the Society.

The proposed method of test for compressive strength for portland cement mortars also includes general requirements for cement mortar testing machines. Although these requirements are not as restrictive and specific as some engineers may desire, nevertheless they indicate the general requirements which should be set up in the purchase of a testing machine for cement mortars.

Methods of Analysis

A working committee under W. C. Hanna has completed a study of methods for making the chemical analysis of cement and the committee has recommended a method which will be available for distribution as a tentative method when sufficient time has elapsed for it to pass through the proper channels of letter ballot and final committee action. Similar methods are used by the Tennessee Valley Authority in making the chemical analyses of cement and if the new specifications for sulfate resistant cement comes into general use calling for chemical requirements the need for a standard method of analysis will be far greater than in the past.

Fineness of Cement

At this meeting it was particularly noticeable that the 200-mesh sieve and old familiar terms "retained on 200" are seldom, if ever, used. Now one hears "specific surface" or "grinding to 1900," etc., without any explanation as to what is meant, for it is assumed that all users of cement understand the meaning to be a surface area of 1900 sq. cm. per gram of cement as determined by a Wagner turbidimeter or similar apparatus.

For those interested in the subject of fineness reference should be made to a very complete report by a working committee—J. C. Pearson, chairman—which compares results of fineness tests made with various pieces of apparatus.

High Early Strength Cement

High early strength cement which filled a large space in the report of the American Society for Testing Materials committee a few years ago has given place to sulfate resistant cement in committee affairs. The present tentative specifications for high early strength cement, C74-30T, was not advanced to standard, but on the recommendation of the committee it will be continued as a tentative for another year.

Concrete and Concrete Aggregates

Concrete Committee C-9—R. W. Crum, chairman—passed for adoption as standard several methods for curing portland cement concrete as follows:

Specifications for Curing Portland Cement Concrete (C80-31T).
Specifications for Curing Portland Cement

Concrete Slabs with Bituminous Coverings (C81-31T).

Specifications for Curing Portland Cement Concrete Slabs with Calcium Chloride Admixtures (C82-31T).

Specifications for Curing Portland Cement Concrete Slabs by Surface Application of Calcium Chloride (C83-31T).

Specifications for Curing Portland Cement Concrete Slabs with Wet Coverings (C84-31T).

These methods of curing are of particular interest to highway engineers and are being made after being held as tentative since 1931.

A proposed specification for sodium silicate for curing was adopted as tentative with some changes from that as preprinted.

The proposed tentative method of tests for coal and lignite in sand was not adopted as tentative, but was referred back to the committee for further study and revision.

The committee report also contains Appendix I on "Comparison of Standards for Colorimetric Test for Sands," which points out some of the necessities for using the colorimetric test as a warning test rather than one to be used too rigidly for rejection.

Appendix II of the committee report is a paper on "Permeability of Concrete," by Donagan and Ernst, which outlines a method being used by the authors to determine the elusive factor of permeability of concrete.

Road and Paving Materials

Committee on Road and Paving Materials D-4—H. F. Clemmer, chairman—presented several proposed tentative specifications covering emulsified asphalt which are the result of several years of hard work on the part of the committee. No doubt these specifications and methods of testing will be welcome to municipal engineers interested in the use of emulsified asphalt. With some modifications, the following specifications and method of test as published in the committee report will be sent out to letter ballot for adoption as tentative standards:

Emulsified Asphalt (Coarse Aggregate Plant Mixes).
Emulsified Asphalt (Retread and Coarse Aggregate Mixes).
Emulsified Asphalt (Heavy Premix—Winter Grade).
Emulsified Asphalt (Heavy Premix—Summer Grade).
Emulsified Asphalt (Quick Setting) for Penetration and Surface Treatment.
Tentative Methods of Tests of Emulsified Asphalt for Use on Roads (Revisions of D 244-T).

It was also recommended to pass to standard, tentative specifications as follows:

Tentative Specifications for Calcium Chloride (D98-33T) as revised.
Tentative Methods of Chemical Analysis of Calcium Chloride (D345-32T).

Changes in the proposed revision of the methods of tests were quite extensive and it will be necessary for laboratories called upon to use these methods to bring their information up to date by reference to the committee report following the meeting.

Committee on Lime

Committee on Lime C-7—J. R. Withrow, chairman—seemed to be unusually active,

which will no doubt be reflective in a forthcoming report. The use of lime as an admixture with portland cement brings up new problems in manufacture with particular emphasis on the control of the magnesium oxide in lime to be used as an admixture.

The committee report proposes the elimination from specifications of the detailed descriptions of test methods to publish these collectively along with methods of chemical analysis, in accordance with what is becoming regular Society procedure.

The Committee presented a proposed tentative method of physical tests for limestone, quicklime and hydrated lime along these lines with an additional method for the preparation of lime putty in connection with a new test for soundness of quicklime. This method is familiar to those using it for hydrated lime and it is necessary to properly prepare the quicklime putty for this test. The committee recommendations as affecting standard were as follows:

I. Proposed Tentative Revision of Standards

Specifications for Quicklime for Structural Purposes (C 5-26).

Specifications for Hydrated Lime for Structural Purposes (C 6-31).

Methods of Chemical Analysis of Limestone, Quicklime and Hydrated Lime (C 25-29).

II. Withdrawal of Tentative Revision of Standard

Specifications for Hydrated Lime for Structural Purposes (C 6-31).

Gypsum

Committee on Gypsum C-11 did not hold a meeting in June, but the committee report recommends the passage of the following specifications to letter ballot for adoption as standard:

Tentative Specifications for Gypsum Wall Board (C 36-31 T).

Tentative Specifications for Gypsum Lath (C 37-31 T).

Tentative Specifications for Gypsum Sheathing Board (C 79-31 T).

Concrete Pipe

Committee on Concrete Pipe C-13—A. E. Phillips, chairman—issued a new proposed tentative specification for non-reinforced concrete sewer pipe with complete specifications and test requirements along the lines of specifications for reinforced concrete sewer pipe. The committee further recommended the following revision of standards:

Specifications for Cement Concrete Sewer Pipe (C 14-24).

Also revision of tentative standards:

Specifications for Reinforced Concrete Pipe (C 75-30 T).

The recommended revisions of standard specifications for cement concrete sewer pipe included changes in form and arrangement and a reduction in the number of pipe to be furnished for testing purposes together with the elimination of all reference to knife or two-edge bearing methods for crushing tests. All reference to pipe larger than 24 in. has been eliminated from the specifications as these sizes are to be covered in a new tentative specification for reinforced concrete pipe.

Tentative specifications for reinforced concrete pipe (C75-30T) is subject to a number of revisions, with an increase in strength test requirements for reinforced concrete pipe from 24 to 72 in. internal diameter. The minimum design requirements for the standard class of pipe have been increased from 2,750 to 3,000 lb. per sq. in. and from 4,000 to 4,500 and from 4,500 to 5,000 lb. per sq. in.

The revised specifications require the manufacturer to furnish for test up to 0.5% of the pipe in each size from 24 to 36 in. and in no case less than two specimens.

Tentative specifications for reinforced culvert pipe (C76-30T) were continued as tentative on account of certain revisions which are expected to be made.

Subgrade Testing Methods

Of interest to highway engineers will be the formation of a new sub-committee of Committee D-4 on subgrades headed by C. A. Hogentogler, of the U. S. Bureau of Public Roads, as chairman. In a paper on subgrade testing methods, Mr. Hogentogler reviewed the work of the Bureau of Public Roads in their studies of subgrade soils and outlined the various tests which are made to identify different types of subgrade soils with their behavior in service. The paper invoked considerable discussion of this subject which would indicate that the time is now ripe for committee work and more intensive activity on the part of the Society in connection with testing subgrade soils.

Laboratory Service Test for Pavement Materials

A. T. Goldbeck, director, Bureau of Engineering, National Crushed Stone Association, presented a very interesting paper describing apparatus which has been developed in their laboratory for making a service test of paving material. This apparatus consists of a 14-ft. diameter circular track in which pavement sections are laid and subjected to the action of pneumatic tired wheels or metal rollers.

The author described the apparatus in considerable detail and gave the results of tests made on various types of pavements with the purpose of indicating the wide range in application of this testing device rather than to demonstrate the results obtained with any particular kind of paving material. The paper was discussed by representatives from several highway departments who were also using a similar type of apparatus, which indicated the interest which is developing in the use of some sort of apparatus which will give more comprehensive information concerning the behavior of paving material than can be obtained from the older tests such as the Deval Abrasion, or the hardness and toughness tests made on the aggregates alone.

Study of Cement Composition

H. F. Gonnerman, of the Portland Cement Association, presented a paper of outstand-

ing interest on study of cement composition in relation to strength, length changes, resistance to sulfate waters, and to freezing and thawing of mortars and concrete. The title of this paper indicates the wide scope of the investigation which has extended over a period of three years. Unfortunately the paper was not preprinted and therefore will not be available for study until some future date. In general the conclusions were along the same lines as those in a paper presented by Professor Raymond Davis before the American Concrete Institute at the last annual meeting of that society. The results of the investigation indicated very clearly the advantages of restricting the amount of tricalcium aluminate in cement in order to promote durability, high resistance to sulfate waters and decrease in volume change. The presentation of the paper gave unmistakable evidence that tricalcium aluminate is a bad actor under almost every condition which may arise. Other compounds play their part, but this one seemed to be always coming to the front. The information given in this paper very strongly supports the adoption of the tentative specifications for sulfate resistant portland cement being sent out to letter ballot of the Society. Engineers interested in durability of portland cement concrete when used in mass construction may look forward to studying this paper with a great deal of interest.

Vane Calorimeter

R. W. Carlson, research engineer, of the Materials Testing Laboratory, University of California, presented a description of a new type of vane calorimeter which he has developed for determining the heat of hydration of neat cement paste while curing at substantially constant temperature. This calorimeter has certain advantages over other types of calorimeters, chief among which are its low cost and its suitability for cements which are not readily soluble in acids. The paper presented typical data with diagrams showing the hourly rates of heat of evolution for a number of cements, plotted against the time after mixing. Comparison of these results with those obtained from the heat of solution calorimeter indicates that satisfactory accuracy is obtained by using the vane calorimeter.

The vane calorimeter determines the rates of heat liberation during the hardening of neat-cement pastes. From these rates the total amounts of heat liberated up to any age is computed. Precise measurements are made at intervals of the difference in temperature between the specimen and a surrounding surface, which surface is maintained at a constant temperature and is separated from the specimen by metal vanes.

The method of determination differs from others in that measurements are made on a fairly large neat cement specimen, cured at a substantially constant temperature. The differences in temperature between specimen and constant-temperature surfaces are suffi-

ciently small that they do not appreciably affect the rate of hydration, but are sufficiently large that they can be accurately measured by means of resistance thermometers. The method is suitable for cement which cannot be dissolved in acid, as required in the heat-of-solution method. It is therefore adaptable for cements other than portland, such as puzzolanic cements.

This paper is of particular interest at this time because the calorimeter is needed for studying the heat of hydration of cements for use in mass construction and is particularly applicable to a study of the cement to be produced under the new tentative specification for sulfate resistant portland cement, as there are some engineers who feel that the heat of hydration should become a part of the specifications. Engineers in the construction of mass concrete are also using various admixtures with the hope of lowering the heat of hydration without hurting the setting properties of the cement, and an inexpensive but reliable calorimeter will be a welcome addition to their laboratory equipment.

Suspension Turbidimeter

A paper by Alexander Klein, of the University of California, presented by Professor R. E. Davis, describing a suspension turbidimeter for determination of specific surface of portland cement attracted considerable attention and was thoroughly discussed by those capable of doing so. The apparatus is arranged to pass a beam of light through a sample of cement suspended in castor oil. The intensity of the light passing through this material is measured by its effect on a photonic cell which is connected with a low resistance microammeter, similar to that used with the Wagner turbidimeter. The method, however, according to the author does not involve Stokes law, since the material is maintained in a suspended state during the test. Turbidimeters or other apparatus for determining the surface area of portland cement are of considerable interest to both producers and users. A similar paper presented a few years ago during the days of the 200-mesh sieve would not have developed any particular comment because such apparatus did not concern the users of cement until they became interested in finding out how well the particles of cement are graded, rather than simply determining one particular size of particle by means of a sieve.

Effect of Duration of Moist Curing on Concrete

H. G. Timms, of the Portland Cement Association, presented a paper on "Effect of Duration of Moist Curing on the Principal Properties of Concrete," which gives particular attention to a study of the effect of curing on such properties of concrete as durability and volume change in addition to the effect on strength, which is the property most commonly mentioned in such studies.

A significant feature of the strength test was the smaller differences between the

strength of moist cured and air cured specimens at ages greater than 28 days, exhibited by the high early strength cement. Mortars of better quality were less absorptive, whether the better quality was due to a lower water content or to prolonged curing. The difference in volume change between normal portland cement and high early strength cement was not of great importance. Up to a certain period, increasing the duration of moist curing before exposure increased the resistance of concrete to the destructive effects of freezing and thawing, but further curing did not increase resistance.

Plastic Flow of Concrete

Professor R. E. Davis, of the University of California, presented a further progress report on the plastic flow of concrete under sustained stress as a result of the research work he has been conducting for a number of years. The report was a joint one in collaboration with H. S. Davis and J. S. Hamilton, of the University of California, and according to the authors plastic flow results from a combination of causes which cannot be separated, and the relative importance of each may differ in various cases. The authors presented a large amount of data which unfortunately was not preprinted at the time of presentation.

Compression Tests from Concrete Beams

Based on European developments, the Engineering Experiment Station of Kansas State College, in cooperation with the Kansas Highway Commission, has been making a study of the results to be obtained by testing the ends of 6x36-in. beams after they have been broken by loading at the center. The broken pieces were sent to the Road Materials Laboratory where they were capped with a mixture of cement and plaster of paris and tested in compression. L. H. Koenitzer, of the Applied Mechanics Department, presented the results of the tests, that indicated a rather close uniformity in results may be obtained by this method, which appears to have possibilities for the correlation of compressive strength with modulus of rupture.

Code Developments

(Concluded from page 37)

quippa; Earl F. Serona, Builders' Supply Co., McKeesport, and Charles Booth, State Construction Co., New Kensington.

Los Angeles—George Macdonald, Consolidated Rock Products Co.; H. F. Murphy, Graham Bros., Inc., both of Los Angeles, and Glenn Switzer, Transit Mixed Concrete Co., Pasadena, Calif.

Lime Industry: Application made for exemption from an administrative order which exempts members of a code from any obligation to contribute to the expense of administration of any code other than the code for the trade or industry which em-

braces the member's principal line of business.

Sand-Lime Brick: Approved amendment to the code to permit the Code Authority to submit budgets and schedules of contributions for the support of code administration to the Administrator for his approval.

Exemption asked from an administrative order which exempts members of a code from obligation to contribute to the expense of administration of any code other than the code for the trade or industry which embraces the member's principal line of business.

Concrete Pipe Industry: Asks exemption from same administrative order referred to above.

Talc and Soapstone: Members of Code Authority approved; to represent Southern Zone: J. Frasier Glenn, Georgia Talc Co., Asheville, N. C.; F. F. Farrar, Cohutta Talc Co., Dalton, Ga. To represent Northern Zone: E. W. Magnus, Eastern Magnesite Talc Co., Burlington, Vt.; W. L. Caten, W. H. Loomis Talc Corp., Gouverneur, N. Y. To represent the industry as a whole: Michael Doyle, International Pulp Co., New York City. Non-voting member, secretary: J. B. Aikman, secretary-treasurer, National Association of Talc and Soapstone Producers, Chester, Vt.

Slate Industry: Application for approval of its budget and the basis of contribution by members of the industry for the expense of administering the code. The total amount of the budget for the period from January 22, 1934, to February 1, 1935, is \$15,675. The basis of contribution is to be that percentage of the respective regional quotas which a member's sales in dollars are of the total sales of the industry for each region for the years 1931, 1932 and 1933.

Cement

Michigan State Cement Plant, Chelsea, Mich., will be dismantled and sold for junk. The state rejected bids for the plant on several occasions.

Missouri Portland Cement Co., Independence, Mo., is attracting newspaper attention all over the country because of a United Press dispatch describing the cooling of its plant office by pumping and circulating in the building air at 70 deg. from the limestone mine.

Santa Cruz Portland Cement Co., Davenport, Calif., will have to build its new steel pier only 2,240 ft. long instead of 2,500 ft. as planned, because the water has been found sufficiently deep at 2,240 ft. The pier will carry a pipe line from the plant silos and cement will be pumped to bulk cargo carriers by means of the Fuller-Kin-

yon system. The *Santacruzement*, a new freighter, is about due to arrive on the West Coast from New York, where it was rebuilt into a self-unloading bulk carrier. Construction work has begun on the Long Beach, Calif., unloading and packing plant.

◆ ◆ ◆

The Cement Institute, New York City and Chicago, has started a prestige advertising campaign on the theme "Going Forward with Cement." Various businesses and popular media are used.

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Spokane Portland Cement Co., Irvin, Wash., has recently completed numerous improvements including a Babcock and Wilcox pulverizer, Fuller-Kinyon pumping system, and a Schaeffer poidometer.

◆ ◆ ◆

Three Forks Portland Cement Co., Trident, Mont., has completed improvements costing about \$150,000. These include nine new reinforced-concrete silos 30 ft. diameter by 90 ft. high. The plant was expected to begin production in July.

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Production Statistics for June show: produced 8,786,000 bbl., shipped 8,539,000 bbl. from the mills, and had in stock at the end of the month 21,547,000 bbl. Production showed an increase of 12.6% and shipments an increase of 7.0%, as compared with June, 1933. Stocks at mills were 8.1% higher than a year ago. Total production for the first half of 1934 amounts to 37,088,000 bbl., compared with 27,668,000 bbl. in the same period of 1933, and the total shipments for the first half of 1934 amount to 35,163,000 bbl., compared with 27,927,000 bbl. in the same period of 1933. The statistics here given are compiled from reports for June, received by the Bureau of Mines, from all manufacturing plants except two, for which estimates have been included in lieu of actual returns. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 163 plants at the close of June, 1934, and of 164 plants at the close of June, 1933.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY.

	June		May		April	March
	1933	1934	1934	1934	1934	1934
The month ...	35.2	39.8	37.5	29.6	23.0	
The 12 months ended	26.0	27.1	26.7	25.9	25.0	

Portland Cement Yardage

AWARDS of concrete pavement for June, 1934, are announced by the Portland Cement Association as follows:

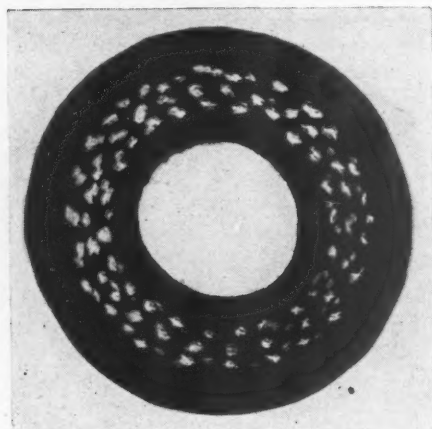
	Sq. yd. awarded during June, 1934	Sq. yd. awarded to date, June 30, 1934
Roads	1,572,372	11,865,014
Streets	1,013,961	7,750,003
Alleys	41,318	84,518
Total	2,627,651	19,699,535

New Machinery and Equipment

Air Hose

TWO NEW TYPES of air hose now are offered by Electric Hose and Rubber Co. Designed particularly for direct connection to portable air compressors, the electric portable compressor hose of the company has a lining compound which resists internal heat and oil contact.

The electric rock drill hose has been developed especially for quarry and similar



Cross section of rock drill hose

work where hose must be dragged over rocks and rough surfaces which tend to cut or shear it. As shown in the illustration, it is covered with an extra heavy layer of rubber and is thoroughly reinforced.

Cushion Clutch

WITH A DIPPER hooked under an "immovable" load, old-time operators will remember how the steam in the cylinder acted as a cushion and gave a few more

seconds' time to ease up on the throttle before a cable snapped or a dipper stick gave way. Engineers of the Northwest Engineering Co. have announced a clutch that per-

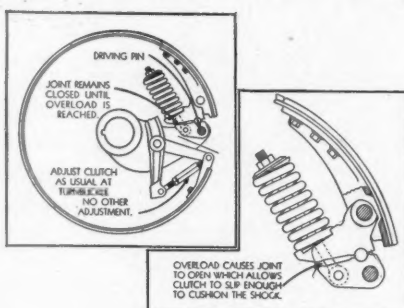


Diagram of cushion clutch operation

mits the modern machine to retain its great power, they say, and still give it the "steam cushion" advantage.

The cushion clutch is an overload release on the main clutch of the hoist drum. No matter how tightly it is adjusted, says the company, it limits the hoist rope pull to a definite point. The natural result, according to a reported test, is reduction of maximum loads on the drum shaft and clutch adjustment, and increased cable life.

Modern Shovel Cab

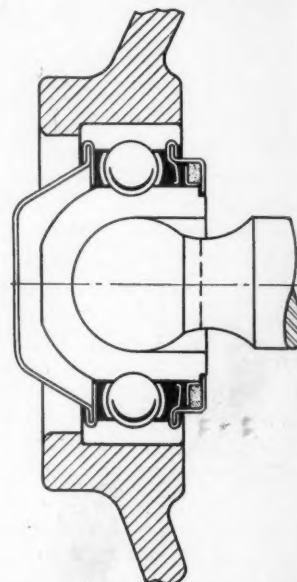
FRONT OF THE CAB shown in the accompanying illustrations of the new 10-B Bucyrus-Erie excavator, is a streamlined unit, designed for full vision on both sides as well as in front. Color as well as design is in the modern manner. An aluminum-colored roof contrasts with the green body and base of dark olive.

This unit weighs 7½ to 8 tons, says the company, and travels at speeds up to 4½

miles an hour. It has a tail swing of 5 ft. 7 in. "Digging motions," says the company, "are fast; controls are responsive, making it easy for the operator to hold accurate grades. It moves readily up grades even steeper than 30 percent."

Seal Is Feature of New Conveyor Roll Bearing

FOR FINAL TESTING of the new "N-D" sealed bearing for conveyor rolls, recently introduced by the New Departure

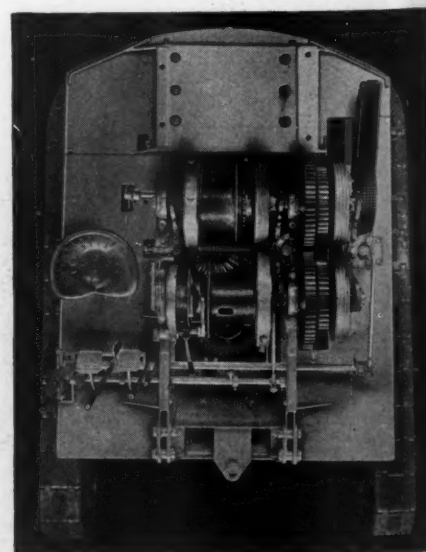


Cross-section of conveyor roll seal

Manufacturing Co., conveyor rolls equipped with the new bearings in the company's laboratories were flooded 24 hours a day with a mixture of water, sand and clay.



Power shovel with streamline cab. This is the Bucyrus-Erie Model 10-B. Model 34-B, announced in August, is a new 1¼-yd. full convertible shovel powered by a 115-hp. gasoline engine for dragline, clamshell and other uses.



Mechanism and control arrangement in new stream-lined shovel cabs

This material was directed against the seal, and the company reports that the mechanism withstood the test and proved the contention that conveyor rolls thus equipped are "permanently sealed and lubricated for life."

Conveyor roll units designed around this seal, says the company, can be easily and quickly assembled by any operator who can handle a wrench. Brackets are bolted in place, stub shafts pushed through until the ball ends seat in the spherical end races (as shown in the illustration), and the locking bolts then are inserted and tightened. It is claimed that this operation eliminates all of the costly and time-taking maintenance routine necessary to keep some older types of conveyors efficient.

The N-D seals are housed in conveyor rolls with a press fit. When the seals are mounted, a waterproof compound is used to plug the puller holes to keep out water and dirt. With two cored slots diametrically opposed in the housing, however, a simple pulling tool may be used to withdraw bearings from worn or damaged rolls. On Robins conveying equipment this seal now is standard.

Fireless Locomotive

THE LOCOMOTIVE shown in the accompanying picture weighs 42 tons. It is of the fireless type and as an experiment it recently was substituted in regular switching service for a 50-ton conventional steam locomotive. It is reported that it was put in use early in the morning of the test with 165 lb. of steam. Twice during the day it was recharged. At the end of the day it is claimed there still remained 75-lb. pressure on the tank. The report further stated that the fireless unit handled with ease a train of nine loaded cars up a grade and around reverse curves.

The fireless locomotive is a steam unit without boiler or firebox. In place of a boiler, the Heisler Locomotive Works supplies a tank of welded construction with a capacity of about three times that of an ordinary locomotive boiler.

The tank, which is heavily lagged and jacketed to prevent heat loss, is filled with water to about four-fifths the capacity. Then, by a steam pipe running from a stationary boiler to a point below the level of the water in the tank, the water is heated until the pressure and temperature in the locomotive tank are the same as in the boiler from which the charge is being taken.

With this stored heat, tractive force is developed through expansion of steam in the large low-pressure cylinders of the locomotive. Says the company: "Our locomotive is well protected against heat losses. It can be left standing several days without losing sufficient pressure to render it inoperative. Heat losses by radiation while the engine is working are negligible."

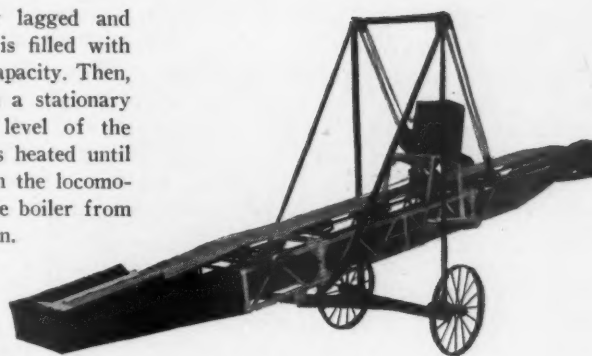
Powder Merger Completed

ALTHOUGH manufacturing facilities are being continued at Giant, Calif., the Giant Powder Co. of San Francisco now is combined with Atlas Powder Co., parent concern of Wilmington, Del., and all business of the western company will be conducted under the name of Atlas Powder Co., Giant Division.

The Giant Powder Co. purchased exclusive American rights to manufacture under the original Nobel patents on dynamite in 1868, and has been manufacturing explosives for 66 years.

Portable Conveyor

A PORTABLE conveying unit said to have new features to make it convenient and economical for the handling of sand, gravel and cement and other bulky, abrasive materials is announced by Northern Conveyor and Manufacturing Co. The loading end of each unit, says the company, is so designed that material is prevented from getting between the belt and the lower roll.



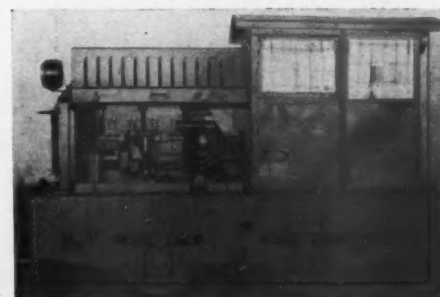
Portable conveying unit

Describing this portable unit, E. J. Leach, general manager of the company, says: "It is equipped with accurately balanced troughing idlers, rigid crown faced drum with mountings on the head shaft next to the boxes, giving long life to the shaft and boxes. Its frame is sectional and the sections are interchangeable."

"It is mounted in a handy truck with roller bearing wheels easily operated by a raising and lowering device. Wheels are arranged so that they can be pivoted, placing them on the circumference of a circle with the center at the loading end of the conveyor, thus permitting the conveyor to be pivoted on the loading end and discharging material in the arc of the circle."

Diesel Locomotive

THE Whitcomb Locomotive Works Co. of Rochelle, Ill., announces a new series of Diesel powered, mechanical transmission



Whitcomb Diesel locomotive. On page 65 of June issue this illustration was incorrectly identified as a Brookville Diesel unit

drive locomotives incorporating a solid injection power plant having the same general performance characteristics as the gasoline engine which it replaces. It has a total weight of 16,000 lb., evenly distributed over four drivers, and will handle a trailing load of 277 tons on a level track. The hourly fuel consumption is less than 2 gal. with the Diesel engine operating at a 50% load factor, the manufacturer states. The Diesel engine is equipped with an electric starter and the control system has been simplified to eliminate confusion of the operator.



Steam locomotive without boiler or firebox

Screen Line Added

ALL U. S. PATENTS and pending patent applications under which a complete line of vibrating screens, washing and scrubbing apparatus has been manufactured by Niagara Concrete Mixer Co., now have been acquired by W. S. Tyler Co. Effective immediately, says the latter concern, all orders for screens, etc., should be sent to it.

To accommodate present users of Niagara screens and scrubbers, the Tyler company is carrying an ample stock of repair and replacement parts.

Furnace-Boiler

DESIGNED to provide a coordinated unit comprising a two-drum boiler, water-cooled furnace, burners, superheater, economizer and air heater, an integral furnace-boiler is offered by Babcock and Wilcox Co. It is applicable in industrial plants "where operation at high nominal ratings with high final steam temperatures is desired."

Direct Current Motors

A NEW LINE of direct current motors designed for application where dust, dirt, moisture, etc., is present in large quantities, has been introduced by General Electric Co. New motors in this line are wholly enclosed, fan-cooled, and are available in sizes up to 200 hp. A system of dual ventilation is used. Water-tight conduit boxes, labyrinth seals and cartridge-type bearing housings effectively protect working parts of the motor.



Fan-cooled totally enclosed direct-current motor

Electric Co. New motors in this line are wholly enclosed, fan-cooled, and are available in sizes up to 200 hp. A system of dual ventilation is used. Water-tight conduit boxes, labyrinth seals and cartridge-type bearing housings effectively protect working parts of the motor.

Rubber-Lined Valves

DESIGNED for handling corrosive and abrasive fluids under fairly high pressure conditions, and under suction or pulsating pressure operation, a new rubber-lined valve, known as "Vulcalock" is announced by B. F. Goodrich Rubber Co. Hard or soft rubber compounds, depending upon the conditions of service, are available.

Action of the new valves does not depend upon a flexible diaphragm. Says the company: "The resilient, rounded disc which snaps over a circular plate at the lower end of the stem provides an absolute seal when

brought into contact with the molded rubber-covered seat. The valve may be taken apart



Valve for abrasive fluid

completely and easily reassembled, according to the designers who declare that no special tools are needed for this purpose.

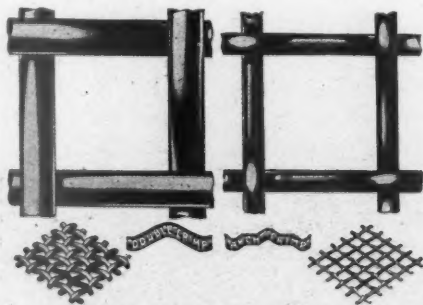
Explosives Plant Acquired by Chemical Firm

PLANT and business of Burton Explosives, Inc., Cleveland, Ohio, has been taken over by American Cyanamid and Chemical Corp., New York, N. Y. A line of high explosives and blasting supplies has been produced by the former concern since 1930 at its plant in New Castle, Penn.

Facilities for producing and converting raw materials for explosives are maintained at the Pennsylvania plant which has a yearly capacity of 18,000,000 lb.

Heavy Duty Screens

OFFERED for use where severe service is required of vibrating screen sections and revolving-screen cylinders, "Super-Loy" screens have been developed by Ludlow-Saylor Wire Co. By careful crimping and fabrication, says the company, natural resilience of the metal alloy used "increases the



Screen weave at left recommended for extra-heavy duty. Weave at right is adaptable for lighter screen work

interlocking pressures which grip the wires together at intersections."

Although the company states that Super-

Loy wires are characterized by great hardness and toughness, they are "not to be confused with the higher priced manganese steel wires." The Super-Loy screen units, however, are making thorough and exact separations, according to the company, "long after ordinary screens have gone to pieces."

Electrode for Welding Aluminum

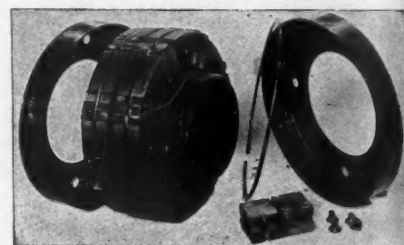
THE Lincoln Electric Co., Cleveland, Ohio, announces a new electrode for welding aluminum which will be known as "Aluminweld." The new electrode is a 5% silicon aluminum alloy and can be used for welding sheet or cast aluminum, the manufacturer states. It is designed for either metallic or carbon arc welding.

It is provided with a coating which prevents excessive oxidation and is said to dissolve any aluminum oxide that might be formed. The manufacturer claims that the coating assists in giving a very smooth operating arc.

Aluminweld is produced in four sizes, 3/32, 1/8, 5/32 and 3/16 in.

New Couplings

FOR PROVIDING a simple, yet positive and flexible coupling between motor or engine and driven machinery, Westinghouse Electric and Manufacturing Co. is offering



Coupling assembly units

its new type WH flexible coupling. The unit consists of two identical cast steel flanged halves, two sheet steel cover plates and a pair of retaining rings as well as from five to 22 flexible elements depending on the size. Flexible elements and the periphery of the coupling flanges are provided with a groove into which the snap rings are inserted.

Insulated Cable

A REFERENCE BOOK has been issued on insulated cable by General Electric Co. which recommends the work for its practical information on the transmission and distribution power at normal frequencies. In concise form, data are offered to enable operators to select cables best adapted for particular applications.

One section of the book deals particularly with cables for buildings and small industrial plants. Full data are given on abrasion resisting finishes, weatherproof braiding, jute and asphalt finishes, etc., for cables.

THE INDUSTRY

New Incorporations

Kansas City Crushed Stone Co., Kansas City, Mo., incorporated by R. S. Eastin and J. M. McCune.

Berlin Brick and Sand Co., Atlantic City, N. J., 100 shares no par, to operate a concrete products business.

Vigus Quarry and Material Co., Vigus, Mo., incorporated by M. D. Maguire and J. F. Ansbro of Saint Louis, Mo.

Silica Products Co., Tekamah, Neb., \$5,000 authorized. Duane S. Tomlinson, Sylvester Wassum and Thomas C. Harey.

Henry Cowell Lime and Cement Co., San Francisco, Calif., filed articles of incorporation with County Clerk Henry A. Pfister.

McDowell-Cooley Gravel Co., Kansas City, Mo., incorporated with R. N. McDowell of Kansas City and C. G. Cooley of Chillicothe, Mo.

Union Silica Co., Louisville, Ky., incorporated with a capital stock of \$5,000 by John H. Jefferson, H. B. Hammond and E. S. Monchan, Jr.

Breakwater Stone Corp., Stony Creek, Conn., capital, 400 shares no par, paid \$2,000. Incorporators are Emile Bonnot, J. A. Lauridsen and F. F. Kane.

Metro Cast Stone Co., Inc., Bronx, N. Y., artificial stone and brick. Articles of incorporation filed by Harry Greenberg, 302 Broadway, New York. 200 shares no par value.

Neidner Tile Co., Milwaukee, Wis., to deal in all kinds of tile and terrazzo materials. 494 shares no par value. Ed C. Neidner, J. G. Schlitz and G. Lenarduzzi are the incorporators.

Granite Materials Co., Los Angeles, Calif., rock and gravel. Incorporators: Claire B. Newberry, F. J. Newberry and A. E. Wolfe with a capital stock of 50,000 shares, par value \$1.00.

Tennessee Stone Co., Inc., Knoxville, Tenn., has filed charter of incorporation to quarry, drill or otherwise produce for market, stone, marble and granite for building or other purposes. Incorporators are: Mrs. Hazel Ruth Schubert, P. D. Cate and Louis B. Schneider with a capitalization of 1,000 shares, \$10 par value common.

Personals

James Leenhouts, retiring president of the Gypsum Association, was honored recently at a luncheon given by the organization's board of directors.

A. T. McGown, formerly auditor for the National Lime and Stone Co., Findlay, Ohio, has been appointed Chief Deputy U. S. Marshal for the northern district of Ohio.

Mark Small of the Lehigh Portland Cement Co., Kansas City, Mo., recently addressed the Rotary Club in Fort Scott, Kan., on the history and use of cement.

Claude K. Boettcher, Denver, Colo., identified with the cement industry as well as investment banking, has been elected chairman of the board of the American Beet Sugar Co.

Henry S. Gray, secretary-treasurer of the Louisville Cement Co., Louisville, Ky., has been named a member of the Industrial Advisory Committee for the Eighth Federal Reserve District.

M. O. Matthews, general manager of the Oklahoma Portland Cement Co., at Ada, Okla., has been elected to the board of directors of the Southern States Industrial Council, an organization functioning to promote southern industries.

Thomas McCrory has established offices in the Seaboard Building, Seattle, Wash., following his appointment as executive secretary of the crushed stone, sand and gravel and slag code authority for district No. 2, which comprises all of western Washington. Mr. McCrory formerly was chief engineer of the Washington State Highway department.

Obituaries

Henry Bode, president of the Bode Gravel Co., San Francisco, Calif., died July 1 at the age of 55.

Frank A. Brewer, 79, president of the Duluth Crushed Stone Co., Duluth, Minn., died June 23.

Harry S. Eggert, 34, works manager of the Milwaukee plant of the United States Gypsum Co., died recently. He had managed the Milwaukee plant since 1922.

William E. Foote, 70, Gasport, N. Y., for 20 years superintendent of the Wickwire Spencer Steel Co., quarries at Middleport, N. Y., recently was killed in an automobile accident.

Ruel Chaffee Warriner, vice-president of the Calaveras Cement Co., San Francisco, Calif., died in Johannesburg, South Africa, July 1. He first went to South Africa as a mining engineer in 1898, and returned to the states in 1917.

Elmer McCraney, 67, president of the Milan Sand and Gravel Co., Davenport, Ia., died recently after a short illness. He founded the sand and gravel concern eight years ago, following his connection with the McCraney Sand and Gravel Co. and extensive coal and shipping interests.

Frank C. Jordan, 49, Elkhart, Ind., was killed in an automobile accident which occurred recently as he was returning to his home from Clinton, Ind., where he operated a gravel plant. Once a mason contractor, the deceased started a gravel business in 1920 and in 1923 established F. C. Jordan, Inc., for operation of his cement block plant and the gravel business.

Edmund Kearsley Swigart, 67, senior vice-president of the Bucyrus-Erie Co., South Milwaukee, Wis., died at Ballard Lake, Wis., July 7. He joined the company in 1891. Mr. Swigart was a member of the executive committee and board of directors of Bucyrus-Erie Co., and on the directorate of Bucyrus-Monaghan Co., Chicago, and the Oilgear Co., Milwaukee.

Llewellyn W. Jones, founder and president of the Manganese Steel Forge Co., and president of the Audubon Wire Cloth Corp., Philadelphia, Penn., died in Rosemont, Penn., June 24. He was 72. A member of the Engineers' Club in Philadelphia, the deceased was connected successively with the following companies over a long period of years: Philadelphia Drop Forge Co., Schoen Pressed Steel Co., M. B. Suydam Paint Co., Pittsburgh Filter Co. and Cyclops Foundry Co. He founded the Manganese Steel Forge Co. in 1921, and was a pioneer producer of manganese steel wire.

Quarries

Mark Mathes has completed construction of a rock crushing plant at Aurora, Mo.

Frank Henderson, Richmond, Mo., now is operating portable rock crushing equipment.



The late E. K. Swigart

Three quarries recently were opened in July as relief projects near McConnellsville, Ohio.

Waverly Quarries, Waverly, Mo., recently have furnished employment for about 65 men.

Local authorities in South Lancaster, Wis., are operating rock crushing equipment as a relief project.

Rock crushing equipment recently was put in operation near Cassville, Mo., by the state highway department.

Extreme hot weather has caused operators of the Auxvasse Quarry near Auxvasse, Mo., to conduct operations at night.

Two stone crushers have been installed in the Coldwater township quarry near Ackley, Ia., in connection with highway projects.

Various sites have been inspected near Glasgow, Ky., for development as rock quarries to furnish material for state highways.

Glenn Sherard, Winterset, Ia., has opened a limestone dust mill for production of pulverized limestone for commercial purposes.

Edwin Cox Quarry Co. has been awarded the contract for furnishing crushed stone on Route No. 20 between Fayette and Glasgow, Mo.

Cox Quarry, Fayette, Mo., recently resumed operations after a shut down due to uncertainty caused by the NRA crushing code.

Van Orman rock crushing plant was put in operation again recently at Hartshorne, Okla., for production of railroad track ballast.

Parker-Schram's Borney Point quarry in July was scheduled for reopening in August. Material will be freighted down the Columbia River.

Crushed stone as well as gravel is being processed with rock crushing equipment under the direction of County Engineer C. E. Fesler, Coffeyville, Kan.

O. M. Collins, Clarkston, Ida., recently was awarded \$500 compensation for quarry property damage from the state by a court order. Damages sought were \$5,500.

The Tateville Rock Co. has been organized by Paul Dexheimer and others of Somerset, Ky. The Tateville quarry has been leased from the state highway department.

After modernization of plant and equipment, the municipal stone crushing plant at Amesbury, Mass., recently was put in operation. Frederick W. Merrill is in charge.

Pennsylvania-Dixie Cement Corp., limestone quarry at Marcell, Va., was scheduled for operation August 1, in connection with reopening of the company's cement mills in Tennessee.

J. E. Coleman has leased rock quarry property from Edward Taha, Corning, Ia., for immediate development. The new company expects to quarry and crush rock to be used on various nearby highway projects.

The protest of emergency relief workers operating the county rock crushing project in Independence township near Centerville, Ia., recently was successful when the board of supervisors acceded to the demand for retention of a foreman recently displaced by order of the board.

Although other industries in the state of Washington were affected directly or indirectly by the recent strike, the **Willapa Harbor Quarries**, South Bend, Wash., went ahead with commercial production. The **Harbor Sand and Gravel Co.** of South Bend, participated in disposition of the fine rock shipped out on contract. Homer Johnson, also of South Bend, recently prepared to put into operation the old Dennis quarry opposite Eklund Park.

Lime

Thomas Coal and Lime Co., Pueblo, Colo., is considering an increase in capacity of its lime plant. Running steadily throughout the winter during the last three months the company's lime plant has been subject to a gradual increase in business.

Sand and Gravel

Brown gravel pit north of Lucas, Kan., has been source of road material for an extensive county highway improvement project.

Waverly Sand and Gravel Co. plant, Shell Rock, Ia., recently was damaged by fire when electrical equipment was put out of commission due to lack of automatic control.

J. E. Warner, Newcomerstown, Ohio, has opened up a new sand and gravel pit.

V. G. Kleinknecht, Coshocton, Ohio, has opened a bank run gravel pit.

Strathmann Sand and Gravel Co., Philadelphia, Penn., has purchased new office and stable buildings on property in the railroad shipping district.

M. O. Weaver Construction Co., Iowa Falls, Ia., has moved its office to Des Moines. The company is reported to have secured contracts grossing over \$100,000 on Arkansas road contracts.

Cement

Lone Star Cement Co., plant, Bonner Springs, Kan., began operation in July.

Alpha Portland Cement Co. was host to a group of mine engineering students from Ohio State University recently at its plant in Ironton, Ohio.

Santa Cruz Portland Cement Co. employees, Santa Cruz, Calif., held a July picnic attended by more than 500 at the San Vicente trout farm. . . . Employees of the Superior Cement Corp., Portsmouth, Ohio, drew a crowd of 1,000 to its picnic, July 4.

Signal Mountain Portland Cement Co., according to its president, John L. Senior of Chicago, who recently visited the company's plant in Chattanooga, Tenn., has more cement orders on hand at the present time than in 1933.

Pennsylvania-Dixie Cement Corp., plant at Kingsport, Tenn., began partial operation in July, preparatory to resumption of operations in all departments by August 1. The plant has been shut down since May 1 for painting and repairs, although shipments have been made from the plant.

Manufacturers

Chase Foundry and Mfg. Co., Columbus, Ohio, manufacturers

of quarry cars, announces appointment of Noel D. Veth as Chief Engineer. Mr. Veth was associated with The Watt Car and Wheel Co., from 1927 to 1931. He has designed many models in cars, including the Hoist Two-Way Side Dump, the Fifth Wheel Automatic Side Dump, and many special-purpose cars. He also designed a hoist skip of much lighter weight. Mr. Veth is a graduate mechanical engineer Ohio State University. He had several years of shop experience prior to his college training. At the present time Mr. Veth is engaged in developing cars of special efficiency for the rock products industry and several of his models are now in production.

Chain Belt Co., Milwaukee, Wis., announces placement of stock in its warehouse in Detroit, Mich. Stock there includes all types of malleable and steel chains, steel roller chain, chain sprockets, buckets, pillow blocks, etc.

Timken Roller Bearing Co., Canton, Ohio, announces resignation of H. H. Timken, president, and election of W. E. Umstätt to succeed him. Mr. Timken remains as chairman of the board. H. H. Timken, Jr., was elected vice-president of the Timken Roller Bearing Co., and also of the Timken Steel and Tube Co.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., announces an enlarged exhibit in the electrical group at the 1934 Chicago World's Fair. Divisions of its power and distributing, research and industrial displays include water wheel generator, steam turbine, Deion circuit breaker, steel mill electrification and mill drive.

Trade Literature

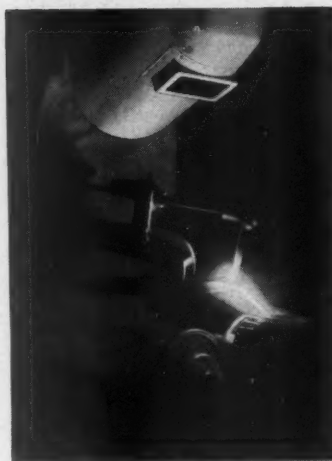
Feeder. Simple weighing feeder described in leaflet with diagrams. HARDINGE CO., INC., York, Penn.

Valves. Cardboard cutout of valve shows cross section and lists data in brief. JENKINS BROTHERS, New York, N. Y.

Speed Reducers. Bulletin No. 271 describes line of vertical "Motoreducers." FALK CORPORATION, Milwaukee, Wis.

Scrapers. Planograph bulletin shows "Evolution of the Power Scraper." Green patents outlined. L. P. GREEN, Chicago, Ill.

Valves. Bulletin No. 702 describes regulating valves for oil flow to burners.



"Masked Marvel"

Harnischfeger Corp., Milwaukee, Wis., one of the many exhibitors enlarging their displays at the 1934 Chicago World's Fair, announces the "Masked Marvel" as the feature of its new exhibit. The operator, to the accompaniment of a voice record, demonstrates the many uses of welding with the P and H Hansen arc welder.

HAUCK MANUFACTURING CO., Brooklyn, N. Y.

Graders. New "Caterpillar" catalog shows complete line of company's leaning wheel graders. CATERPILLAR TRACTOR CO., Peoria, Ill.

Hoists. Bulletin No. 12107 describes single drum and double drum air hoists. Control features stressed. INGERSOLL-RAND CO., Phillipsburg, N. J.

Pipe Line. Story of delivery of concrete by pump and pipe line told graphically in elaborate rotogravure issue. CHAIN BELT CO., Milwaukee, Wis.

Dippers. Folder describes design of Amsco renewable lip all manganese steel dipper. AMERICAN MANGANESE STEEL CO., Chicago Heights, Ill.

Pumps. Folder D-475-B9 outlines types of internal bearing double helical rotary pumps. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Gears. 1934 type of this company's gear type of flexible coupling briefly described in folder. POOLE FOUNDRY AND MACHINE CO., Baltimore, Md.

Welding. Current practices on design of jigs and fixtures for welding is discussed in mimeographed bulletin. LINDE AIR PRODUCTS CO., New York, N. Y.

Motors. Leaflet No. 2173 illustrates and describes squirrel cage induction motors, type "AR." ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis.

Pumps. Engineering data and illustrations on single-stage centrifugal pumps. Bulletin W-321-B2. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Lubrication. Bulletins describe invention of lubricating device, the "Graph-air gun" in which is used flake graphite. JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

Rope Drives. Concise form given to wealth of engineering data. Company's line of sheaves and v-drives, table of speeds and ratios is included. MEDART CO., St. Louis, Mo.

Crushers. Eight-page illustrated folder "Pioneer Crushers" gives specifications on full line of modern jaw and roll crushers. Dirt- and dust-proofing, anti-friction bearings, special gear drives (for roll units) among features described. PIONEER GRAVEL EQUIPMENT MANUFACTURING CO., Minneapolis, Minn.

Portables. Duplex trailer crushing plant with shovel loading hopper and swivel drive feeder conveyor described fully. PIONEER GRAVEL EQUIPMENT MANUFACTURING CO., Minneapolis, Minn.

Condensers. Folder W-200-B2 describes surface condensers of patented folder tube layer type with welded steel shell design. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Cranes. A house organ, "Crane Engineering," has been brought out in observance of the company's 50th anniversary. Installations of large crane equipment described. WHITING CORP., Harvey, Ill.

Welding. Reprint of E. L. Quinn's paper on "Successful Manganese Steel Welding" read before the Chicago Section of A. W. S. reprinted. AMERICAN MANGANESE STEEL CO., Chicago Heights, Ill.

Cranes. Catalogs No. 73 and 74 describe crane and hoisting equipment. Many illustrations of actual installations of heavy duty cranes are given. AMERICAN HOIST AND DERRICK CO., Saint Paul, Minn.

Grinding. Equipment described for drying and grinding simultaneously. Eight-page bulletin shows blueprints and illustrations of mill operations. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Welding. Twenty-four page illustrated booklet "The Testing and Qualification of Welders" outlines requirements of welding operators. Simple tests are suggested. LINDE AIR PRODUCTS CO., New York, N. Y.

Gears. One hundred and forty-four page booklet (Catalog and Price List No. 53) gives complete series of tables and prices of gears, reducers, chain drives, etc., of various types. GRANT GEAR WORKS, Boston, Mass.

Flotation Process. The Chance Sand Flotation process for cleaning bituminous coal is the subject matter of Bulletin 91 which outlines the principle back of system employed. ROBINS CONVEYING BELT CO., New York, N. Y.

Welding Lens. Importance of proper selection of a protective welding lens is detailed in leaflet which provides data on infra red rays, visible rays and ultra-violet rays in connection with welding operations. LINCOLN ELECTRIC CO., Cleveland, Ohio.

Gears. New 32-page illustrated catalog No. 1415 with horsepower and other engineering data covers single, double and triple reduction units of herringbone gear type. Details also given on full line of flexible couplings. LINK-BELT CO., Chicago, Ill.

Dust Collectors. A series of monthly folders dealing with dust-hazards and their prevention in various industries. Much of the data comprises government reports, reprints from trade press articles. Commercial tests are given. NORTHERN BLOWER CO., Cleveland, Ohio.

Refractories. New 1900 deg. insulating blocks fully described in engineering folder IN-28-A. Principles of combination insulation are discussed. Recommendation is made for two or more insulating materials for use in furnace or boiler walls. JOHNS-MANVILLE, New York, N. Y.

Screens. Illustration of company's screen in sand and gravel plants and phosphate rock plants among feature illustrations in 24-page booklet on "Gyrex" screens. Bulletin No. 90 shows detail of construction and gives full specifications of various models. ROBINS CONVEYING BELT CO., New York, N. Y.

Excavators. Bulletin FBE-101 describes the new 10-B excavator. Various front-end combinations are illustrated and the machine is shown both with and without the modern cab. New developments in construction of this machine described and illustrated in detail. BUCYRUS-ERIE CO., South Milwaukee, Wis.

Screens. Eight-page folder describes "Gyraloy and Super-Gyraloy" screen cloth. Specific processes employed in their manufacture are basis of company's claim that Gyraloy, for example, will outlast other alloy screens from 60 to 200 percent. Bulletin No. 89. ROBINS CONVEYING BELT CO., New York, N. Y.

Power Transmission. Seventy-two page illustrated text book "Short Cuts to Power Transmission" is a revision of data offered for solution of ordinary belt transmission problems. Ordinary discussion of belting is included. Thoroughly illustrated, the booklet contains the necessary tabular matter. FLEXIBLE STEEL LACING CO., Chicago, Ill.

Materials Handling. New device for handling loads in or out of trucks without manual labor described by folder illustrations. Mechanism is for truck tailgate and is in effect a power elevator operated by take-off from the truck motor. The power elevator tailgate is driven by a worm gear with a ratio of approximately 40 to 1. DAVEY COMPRESSOR CO., Kent, Ohio.

Dredges. Thirty-six page bulletin on dredging plants and hydraulic dredge machinery outlines various applications and shows illustrations of dredging units. Hydraulic dredge equipment is detailed. Exterior and interior use of representative installations are given; substantial engineering data included. Bulletin 151. MORRIS MACHINE WORKS, Baldwinville, N. Y.

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A Koehring Shovel with ample power for the tough digging — without nibbling at the bank — with the boom shock absorber to reduce operating strains — with finger tip ease of control, without mechanical complications, for high speed operation.

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MILWAUKEE

Division of National Equipment Corporation

WISCONSIN

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions.

Acetylene Welding Rod

American Steel & Wire Co.

Agitators, Thickeners and Slurry Mixers

F. L. Smidth & Co.

Air Compressors

Fuller Co.
Gardner-Denver Co.
Ingersoll-Rand Co.
Traylor Eng. & Mfg. Co.

Air Filters

Fuller Co.

Air Pumps

Ingersoll-Rand Co.

Air Separators

Raymond Bros. Impact Pulv. Co.

Armortite (for Chute Lining)

B. F. Goodrich Rubber Co.

Babbitt Metal

Joseph T. Ryerson & Son, Inc.

Backdiggers

Ohio Power Shovel Co.

Backfillers

Bucyrus-Erie Company
Harnischfeger Corp.
Ohio Power Shovel Co.

Ball Bearings

S K F Industries, Inc.

Balls (Tube Mill, etc.)

Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.

Bar Benders and Cutters

Koehring Company, Division of National Equipmt. Corp.

Bearings

Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)

S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)

S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)

Timken Roller Bearing Co.

Bearings (Thrust)

S K F Industries, Inc.
Timken Roller Bearing Co.

Belt Fasteners

Flexible Steel Lacing Co.

Belt Lacing

Flexible Steel Lacing Co.

Belting (Elevator and Conveyor)

B. F. Goodrich Rubber Co.
United States Rubber Co.

Belting (Transmission)

B. F. Goodrich Rubber Co.

Bins

Blaw-Knox Co.
Pioneer Gravel Equipmt. Mfg. Co. (Steel).
Traylor Eng. & Mfg. Co.

Bin Gates

Fuller Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Bit Sharpeners and Tools

Bucyrus-Erie Co.

Blasting Cap Protectors

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Blast Hole Drills

Bucyrus-Erie Co.

Blocks (Pillow, Roller Bearing)

Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

Boilers

Combustion Engineering Corp.

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United States Rubber Co.

Breakers (Primary)

Williams Patent Crusher & Pulv. Co.

Buckets (Dragline and Slackline)

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Bucyrus-Erie Co.
Pioneer Gravel Equipmt. Mfg. Co.

Buckets (Dredging and Excavating)

Harnischfeger Corp.

Buckets (Elevator and Conveyor)

Cross Engineering Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equipmt. Mfg. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)

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Harnischfeger Corp.
Hayward Co.
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General Electric Co.
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Macwhythe Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

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Ensign-Bickford Co.

Car Pullers

Link-Belt Co.

Castings

Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery

F. L. Smidth & Co.

Cement Process

Cement Process Corp.

Cement Pumps

Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)

Blaw-Knox Co.

Chain (Dredge and Steam Shovel)

Bucyrus-Erie Co.
Jeffrey Mfg. Co.
Manganese Steel Forge Co.

Chain (Elevating and Conveying)

Chain Belt Co.
Link-Belt Co.

Chain Drives

Chain Belt Co.

Chain Systems (Kilns)

F. L. Smidth & Co.

Chutes

Cross Engineering Co.

Chutes and Chute Liners

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Clamshells

Bucyrus-Erie Co.

Classifiers

Link-Belt Co.

Clips (Wire Rope)

American Steel & Wire Co.
Macwhythe Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls

Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment

Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills

Gardner-Denver Co.

Compressed Air Hoists

Gardner-Denver Co.

Compressors (See Air Compressors)

Condensers

Ingersoll-Rand Co.

Concrete Breakers (Pneumatic)

Ingersoll-Rand Co.

Conveyor Idlers and Rolls

Bartlett, C. O., & Snow Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Conveyors and Elevators

Earle C. Bacon, Inc.
Fuller Company
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Pioneer Gravel Equipmt. Mfg. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)

Fuller Company

Conveyors (Screw)

Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins

F. L. Smidth & Co.

Couplings (Flexible and Shaft)

Link-Belt Co.

Couplings (Hose, Pipe, Etc.)

B. F. Goodrich Rubber Co.
Ingersoll-Rand Co.
United States Rubber Co.

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Koehring Company, Division of National Equipmt. Corp.

Cranes (Crawler and Locomotive)

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Koehring Company, Division of National Equipmt. Corp.
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Marion Steam Shovel Co.
Ohio Power Shovel Co.

Cranes (Excavator)

Koehring Company, Division of National Equipmt. Corp.

Cranes (Overhead Traveling Electric)

Harnischfeger Corp.

Crusher Parts

Pennsylvania Crusher Co.

Crushers (Hammer)

Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)

Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc. (Jaw)
C. O. Bartlett & Snow Co.
Lewistown Fdy. & Mach. Co.
Pennsylvania Crusher Co.
Pioneer Gravel Equipmt. Mfg. Co.
Traylor Eng. & Mfg. Co.

Crushers (Single Roll)

Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.
Pioneer Gravel Equipmt. Mfg. Co.

Crushing Rolls

Allis-Chalmers Mfg. Co.
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Dedusters

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Derricks and Derrick Fittings

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Diaphragms (Pump)

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The Frog, Switch & Mfg. Co.
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Ditchers

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Dragline Cableway Excavators

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Link-Belt Co.
Marion Steam Shovel Co.

Dragline Excavators (Walking)

Bucyrus-Monaghan Company

Dragshovels

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Dredge Pumps (See Pumps, Dredging)

Dredges

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Morris Machine Works

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Drills, Hammer (See Hammer Drills)

Drills (Rock)

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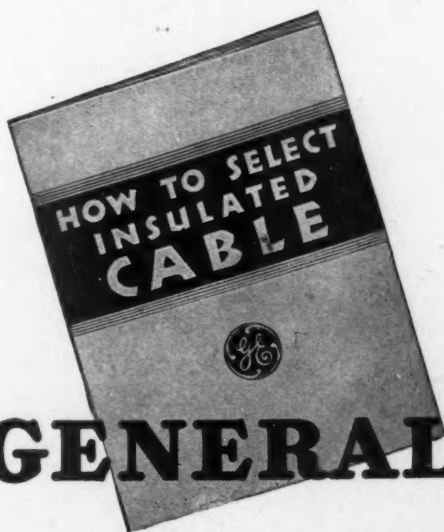
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520-12

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

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Combustion Engineering Corp.
Traylor Eng. & Mfg. Co.

Dumpsters

Koehring Company, Division
of National Equip't. Corp.

Dust Collecting Systems

Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems

Fuller Co.

Dust Hoods and Helmets

Pulmosan Safety Equip't. Corp.

Electric Cables and Wires

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General Electric Co.

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Productive Equipment Corp.
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Ingersoll-Rand Co.

Engines (Steam)

Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Company, Division
of National Equip't. Corp.

Excavators (Dragline)
Koehring Company, Division
of National Equip't. Corp.

Fans

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Fans (Exhaust)

Jeffrey Mfg. Co.

Feeders

Fuller Co. (Cement and Pul-
verized Material)
Jeffrey Mfg. Co. (Pan and
Tube)
Pioneer Gravel Equip't. Mfg.
Co.

Flights

Cross Engineering Co.

Forges (Oil)

Gardner-Denver Co.

Forgings (Steel)

Manganese Steel Forge Co.

Furnaces

Combustion Engineering Corp.

Fuses (Detonating and Safety)

Ensign-Bickford Co.

Fuses (Electrical)

General Electric Co.

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Link-Belt Co.

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

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Pulmosan Safety Equip't. Corp.

Grapples (Stone)

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Hayward Co.

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Manganese Steel Forge Co.
Productive Equipment Corp.
Traylor Eng. & Mfg. Co.

Grizzly Feeders

Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Hammer Drills

Gardner-Denver Co.

Hammer Mills (See Crushers)

Holists

Gardner-Denver Co.
Harnischfeger Corp.
Ingersoll-Rand Co.
Link-Belt Co.
Pioneer Gravel Equip't. Mfg.
Co.

Hoppers and Spouts

Manganese Steel Forge Co.

Hose (Water, Steam, Air, Drill,

Sand Suction and Discharge)
B. F. Goodrich Rubber Co.
Ingersoll-Rand Co.
United States Rubber Co.

Hydrators

Blaw-Knox Co.

Insulation (Electric)

General Electric Co.

Kilns and Coolers (Rotary)

Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
F. L. Smidth & Co.
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Kominuters (See Mills)

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Traylor Eng. & Mfg. Co.
Williams Patent Crusher &
Pulv. Co.

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Power Transmission Machy.

S K F Industries, Inc.

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Pulverizers (See also Crushers, Mills, etc.)

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Mixer Bodies)
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Rock Drills (See Drills, Rock)

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Timken Roller Bearing Co.

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Co.

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Co.
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John A. Roebling's Sons Co.
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Link-Belt Co.
Pioneer Gravel Equip't. Mfg.
Co.
Productive Equipment Corp.
W. S. Tyler Co.
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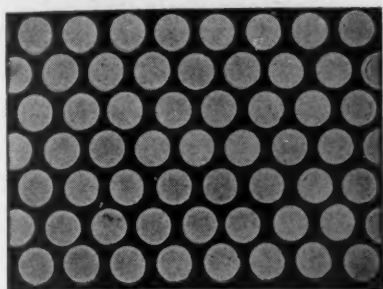
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*Prices are right.
Send for Bulletin 57.*

The Morrow Manufacturing Co.
Wellston, Ohio

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There may be no evident reason why you should specify Hendrick Buckets, but there are a number of good reasons why you should specify Elevator Buckets by Hendrick.

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with 2 MAN CAPACITY!

FIELD



DESIGN

Here's news that quarry men have been waiting for—a one-man drill with two-man capacity.

The NEW Gardner-Denver D-79 Drifter is the fastest 3" bore drill in its class, and the lowest in air consumption, as proved by actual test.

Whether you use it as a drifter or as a sinker (it is easily equip-

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As a sinker, the D-79 can be used continuously because of its light weight and easy riding. As a drifter, the Gardner-Denver "streamline" design permits drilling in close quarters.

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GARDNER-
DENVER
D-79
DRIFTER**

GARDNER-DENVER

MAKES AIR DO MORE AND COST LESS

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For alphabetical index, see page 2

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Link-Belt Co.

Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Spouts, Chutes (See Chutes and Chute Liners)

Spray Nozzles
Binks Mfg. Co.

Sprockets and Chain
Jeffrey Mfg. Co.

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Timken Roller Bearing Co.

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Timken Roller Bearing Co.

Steel (Open Hearth)
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Steel (Special Alloy)
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Steel (Special Analysis)
Timken Roller Bearing Co.

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Combustion Engineering Corp.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.

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W. S. Tyler Co.

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United States Rubber Co.

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A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Troughs
Cross Engineering Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.

Trucks and Trailers (See Motor Trucks)

Trucks (Mixing)
Blaw-Knox Co.

Trunkmixers
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Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
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Tubing (Seamless Steel)
Timken Roller Bearing Co.

Valves (Pump)
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Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
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Eagle Iron Works
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.

Traylor Eng. & Mfg. Co.
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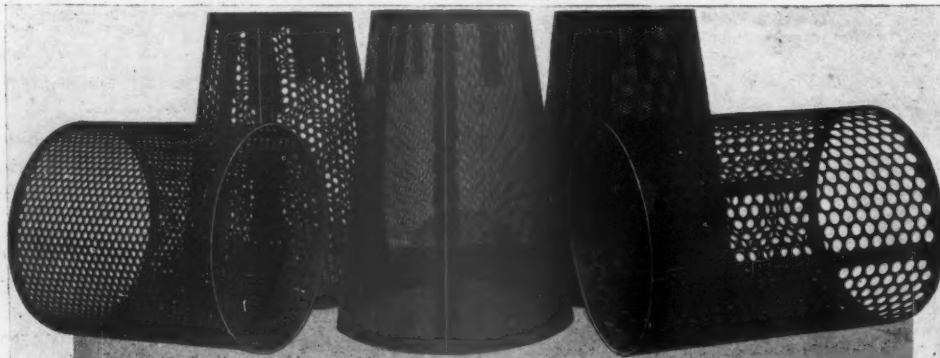
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Wire Rope Sockets (See Sockets, Wire Rope)



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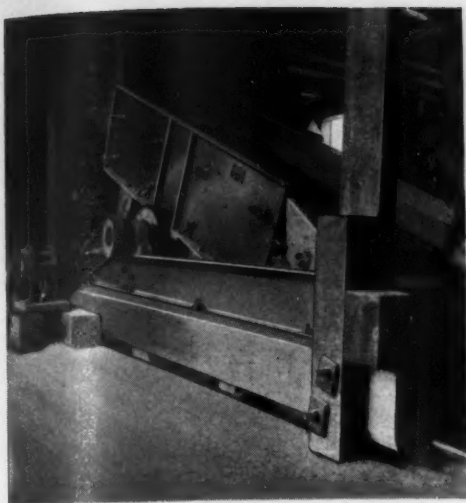
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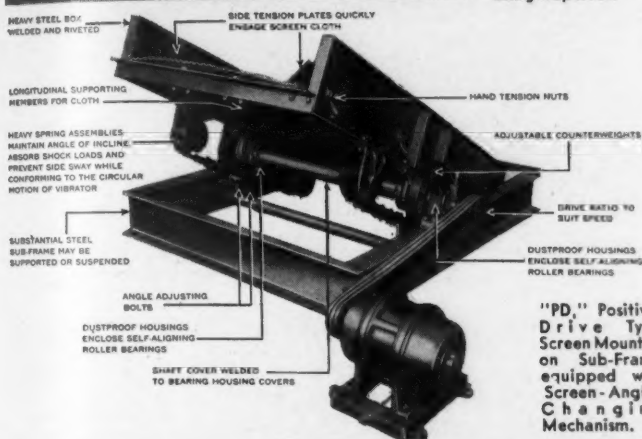


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"PD" Positive-
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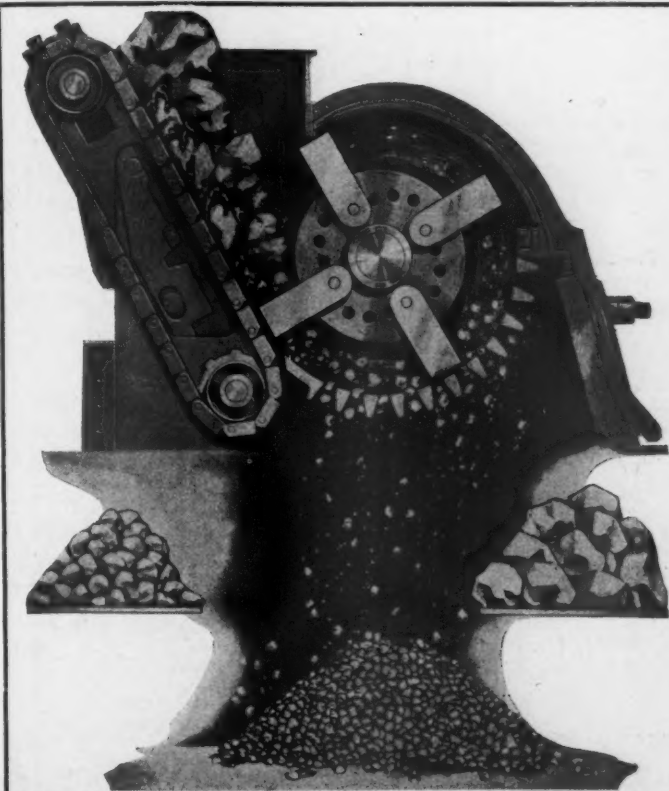
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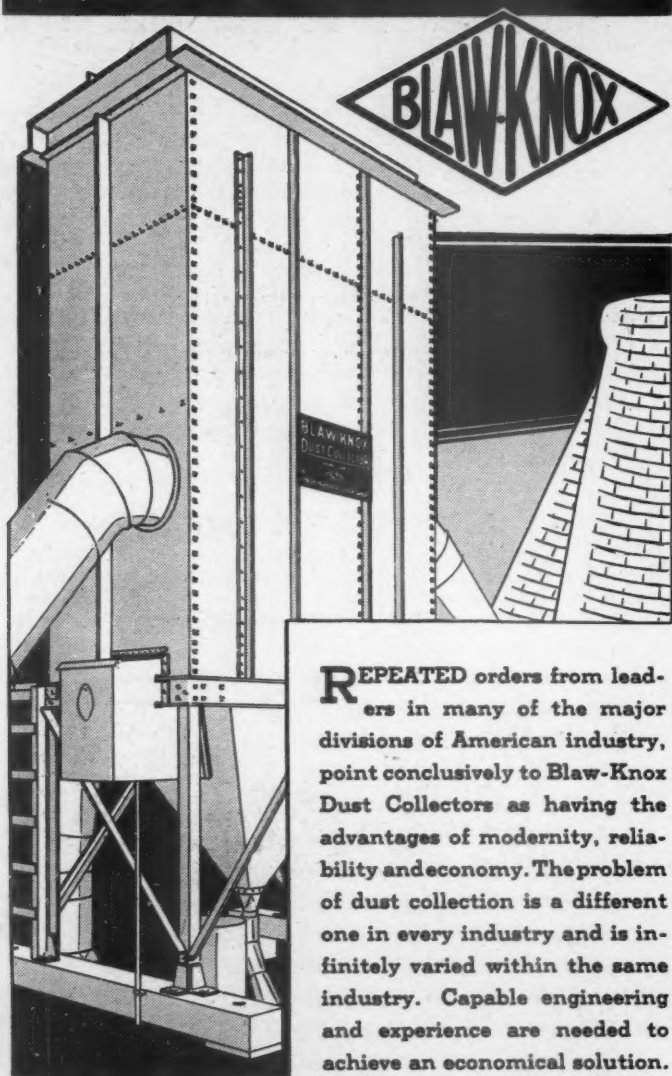


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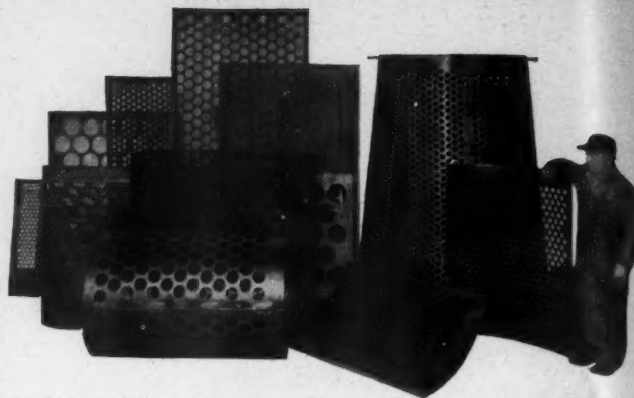
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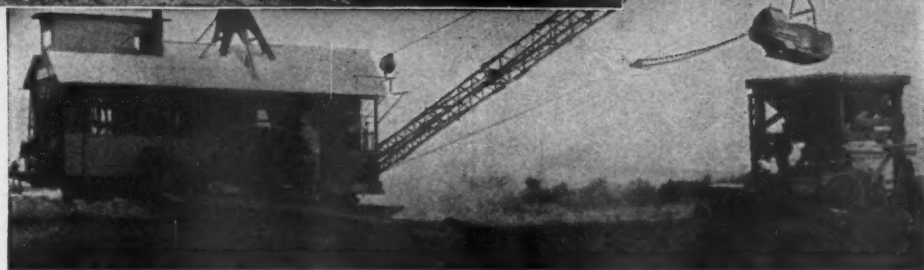
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FASTENERS
for
ELEVATORS
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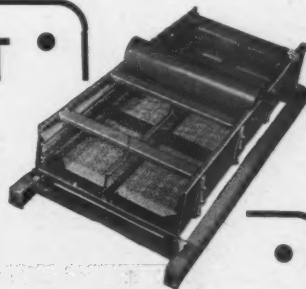
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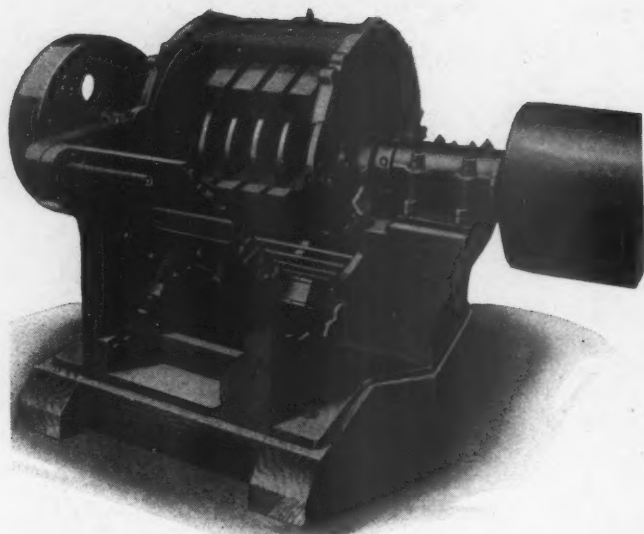
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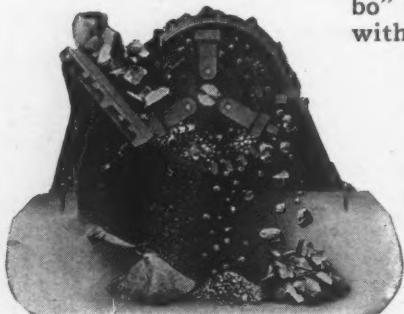


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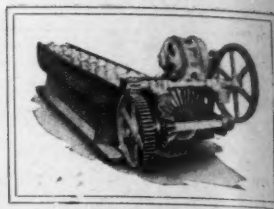
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This scrubber will do the good work.

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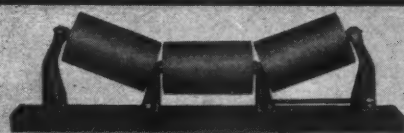
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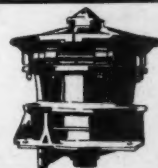
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SIZES 10"x7" to 72"x34"

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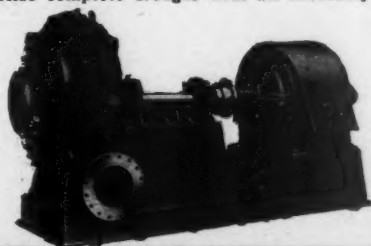
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by the new process!

*Inquiries invited from producers of
cement, lime and allied products.*

CEMENT PROCESS CORP.

P. O. Box 515 Mexico City, Mexico

All processes patented in U. S. and other countries.

"PENNSYLVANIA" STEELBUILT HAMMERMILLS

installed in the largest
Cement Plant in the
British Empire. Five
other plants of the same
Company are "Pennsyl-
vania" equipped.



PENN-PRIMARY Ham-
mermills, PENN-LE-
HIGH PRIMARY ROLLS,
PENNSYLVANIA - BU-
CHANAN Jaw Crushers,
"PENNSYLVANIA" Sec-
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every raw side-crushing
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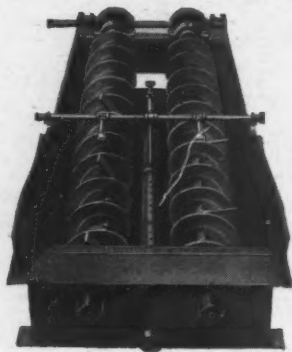
Unbreakable Steel Construction
Positive Tramp Iron Protection

PENNSYLVANIA
CRUSHING COMPANY

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Put Your Reduction Problems Up to Us New York Pittsburgh Chicago

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Single and Double
Spiral Screw and Log Type

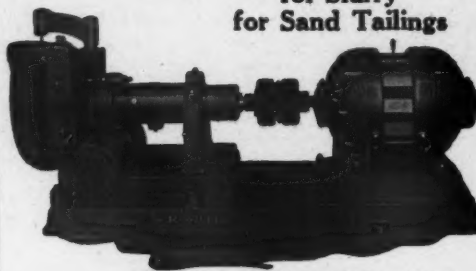
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trash, sticks, leaves, coal,
silt, mud-balls,—to the diffi-
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WILFLEY Centrifugal SAND PUMP

PATENTED
for Slurry
for Sand Tailings



ELIMINATION of
stuffing box has
done away with
many troubles
common to centrifu-
gal pumps.
Pump maintains
extraordinary effi-
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Pumping parts un-
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or changing wear-
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only a few min-
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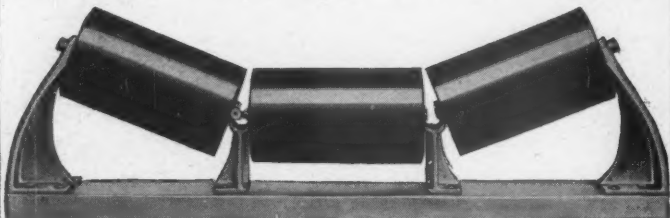
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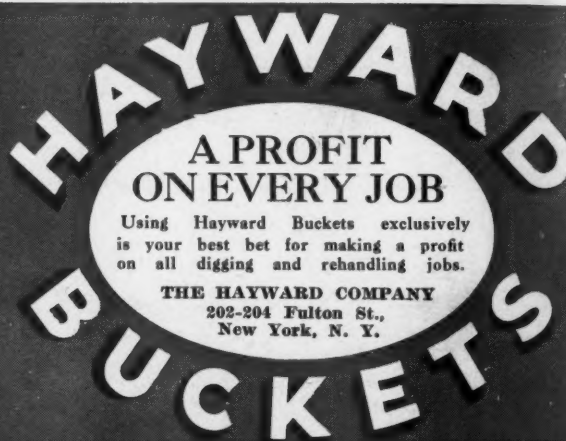
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1649 W. Bruce Street, Milwaukee, Wis.

CHAIN & BELT CONVEYING



Established 1891—Branches or Representatives in all Principal Cities



Using Hayward Buckets exclusively
is your best bet for making a profit
on all digging and rehandling jobs.

THE HAYWARD COMPANY
202-204 Fulton St.,
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CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VA-
CANT—two cents a word. Set in six-point
type. Minimum \$1.00 each insertion, pay-
able in advance.

INFORMATION
Box numbers in care of our office. An ad-
vertising inch is measured vertically in one
column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed.
Rate per column inch, \$4.00. Unless on con-
tract basis, advertisements must be paid for
in advance of insertion.

Used Equipment For Sale

BARGAINS Special Extra

5—21-ton 11x16" Vulcan 36" gauge 4-wheel
saddle tank locomotives, Code boilers,
built 1923.

2—21-ton 11x16" Porter 36" gauge 4-wheel
saddle tank locomotives, Code boilers,
built 1921.

1—21-ton 11x16" American 36" gauge 4-
wheel saddle tank locomotive, Code
boiler, built 1922.

75—4-yard WESTERN 36" gauge steel un-
der frame 2-way side dump cars, box-
door type.

All purchased recent Court Sale at Edge-
field, South Carolina. Immediate shipment.
Thoroughly rebuilt since last used.

**BIRMINGHAM RAIL &
LOCOMOTIVE CO.**

Birmingham, Alabama

Shovels:

- 1—32 Marlon Steam Cats, 1½ Yd.
- 175-B Bucyrus Steam 4-wheel trucks.
- 100-B Bucyrus Erie Electric Cat., 3 Yd.
- 2—Jordan Std. Ga. Air Spreaders.
- 19—K&J 16-Yd. Std. Ga. Air Dump Cars.
- 20—Koppel 30-Yd. Std. Ga. Air Dump Cars.
- 1—Std. Ga. Nordberg Track Shifter.
- 2—36" Ga. Porter Steam Locos.
- 6—4-Yd. 36" Ga. Western Dump Cars.
- 19—Easton 4-Yd. 48" Ga. All Steel End
Dump Quarry Cars.
- 1—5-Ton 48" Ga. Plymouth Gas Loco.
- 1—8-Ton Std. Ga. Plymouth Gas Loco.
- 1—60 Caterpillar Tractor.
- 1—8-Yd. Athey Crawler Wagon.
- 4—1½-Yd. Maney Scrapers.
- 2—28S Kuehring Mixers.
- 1—27E Ransome Paver.
- 1—8' Riddell Grader Cats, Deering Power.
- 1—12' Gallon Leaning Wheel Grader.
- 1—12' Super-Mogul (Russell) Grader.
- 1—856' Sullivan Angle-Cpd., Compressor with
152 HP, 3 PH, 60 Cy., 220 V Motor.

DERRICKS, BOILERS, OIL ENGINES,
ROLLERS, GRAVEL PLANTS, CRUSHERS,
ALL KINDS OF EQUIPMENT. TELL US
WHAT YOU WANT.

THE T. J. LANE CO.,

Box 458

Springfield, Ohio

FOR SALE

MARION STEAM SHOVEL—Model 36,
(Revolving), 24-ft. boom, 1½ cu. yard,
mounted on railway wheels.

LOCOMOTIVE CRANE, Brownhoist, Ele-
vated Pedestal Type, Pedestal height 11
ft. 2 inches, Boom length 48 ft. 3 inches,
equipped with bucket.

CAMERON CENTRIFUGAL PUMPS —
Three No. 10, double suction Volute,
2,000 gallon per minute, Motor driven,
D.C. 230 volt, connected to 100 H.P.
Reliance motor, 1,100 R.P.M., switch-
board included.

RIDGWAY GENERATOR SETS—Two
200 K.W., 200 R.P.M., 240/250 volt D.C.
generators direct connected to Ridgway
18x22 Corliss four-valve engines, switch-
board included.

LOCOMOTIVES — One 65-ton, 6-wheel;
One 40-ton, 4-wheel, H. K. Porter Sad-
dle tank locomotives, Standard gauge.

CRUSHING MACHINE—Two Sturtevant
Mill Co. sampling machines for Labora-
tory use; One Roll Jaw-Type for coarse
grinding; one for fine grinding.

Address Box 621, care of Rock Products,
330 South Wells Street, Chicago, Illinois.

CLASSIFIED ADVERTISEMENTS

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1-2-yd. MARION 480 Shovel-Crane.
1-2-yd. Bucyrus 50B Shovel.
1-1/4-yd. BYERS Crane.
1-1/4-yd. LORAIN 75 Shovel.
1-1-yd. KOEHRING Crane.
1-1-yd. P. & H. 600 Shovel.
1-1/4-yd. P. & H. Shovel-crane.
1-1/2-yd. BYERS Shovel-crane.
30-4-yd. Heavy Steel Stone Skips.
1-265-ft. Gas Portable Compressor and Jackhammers.
Electric Draglines, 2- and 3-yd.
Gasoline Draglines, 1/2- and 3/4-yd.
1-BROWNING Truck-crane.
24" Conveyor 65 and 170 ft.
Clamshell Buckets, 1/2 to 1 1/2 yd.
Crushers 10x18; 15x38; 18x30; 11x26; 12x20.

J. T. WALSH
500 Brisbane Bldg., Buffalo, N. Y.

FOR SALE

1-12' Gayco Separator, model 21.
3-Hardinge Mills, 4 1/2'x16", 5'x22", 8'x30".
1-Allis-Chalmers No. 2 Pulverizer, 20"x12".
2-Allis-Chalmers 10x7", 24x12" Jaw Crushers.
2-Sturtevant No. 1, No. 1 1/2 Rotary Fine Crushers.
1-Sturtevant No. 1 Ring Roll Mill.
2-Raymond five-roll, three-roll Mills.
6-No. 0000, No. 00, No. 1 Raymond Mills.
1-Tyler Hummer, type 31, double unit screen.

STEIN-BRILL CORPORATION
183 Varick St., New York, N. Y.

We buy your surplus equipment.

FOR SALE

Reliance Jaw Crusher, 8"x14".
Farrell Jaw Crusher, 18x36, type B.
Jeffrey Limepulver No. 3 comb. crusher and pulverizer.
Telsmith Revolving Screen, 40"x20".
Double deck 4'x6' vibrating screen.
Trough belt conveyors, 20"x26" wide to 300'.
Conveyor idlers, head and take-up pulleys.
Used conveyor belt, 12" to 36" wide.
Elevator belt, 32" wide, 12-ply, 170'.
Chainhoist, 10-ton, geared, with 12' lift.
Humphrey's 4" Force Trench Pump, 5-8 H.P. LeRol.
American 4" Centrifugal pump, 15 H.P. gasoline.
I. R. Steam 2-stage air compressor, 446 C.F.M.
Shovels, cranes, backfillers and bulldozers.
Hoists, locomotives, cars, switches and rails.

G. A. UNVERZAGT

15 Park Row New York City

CRUSHER FOR SALE

One 9"x21" Telsmith Roller Bearing Jaw Crusher with feed bin and 15 H.P. General Electric Motor, V belt drive. All in good condition.

ERIE SAND & GRAVEL CO.
ERIE, PENNA.

For Sale OSGOOD SHOVEL

1 1/4-Yard Heavy-Duty Gas Shovel in fine working condition.
\$1,500 just spent in reconditioning. Must dispose of at sacrifice—\$4,100 cash.
Address Box 630, care of Rock Products, 330 South Wells St., Chicago, Ill.

USED EQUIPMENT

Marion Gas Electric 3/4-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler
—saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.
SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

FOR SALE

1-1030 Champion Roller Bearing Reduction Crusher.
1-No. 6 Champion 12x26 Jaw Crusher.
2-1/4 Yd. Thew Gas. Cat. Shovels.
JOHNSON AND HOEHLER, INC.
Lansdowne, Pa.

CARS

12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.
HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. 101 West 31st St.
St. Louis, Mo. New York

FOR SALE

2-National Double Drum Electric Hoists, fitted with General Electric 60 H.P., 220 volt, 60 cycle, 3 phase motors, controllers and resistance grids. Will sell very cheap to quick purchaser.
SAMLER MACHINERY & EQUIPMENT CO.
206 W. Pratt Street, Baltimore, Md.

SPECIAL FOR THIS MONTH

300 H. P. General Electric Slipring Motor, 25 cycle, 3 phase, 2,200 volts, 375 R.P.M. complete.
ERIE ELECTRIC MOTOR REPAIR CO., Inc.
126 Church St. Buffalo, N. Y.

USED EQUIPMENT WANTED

WANTED

Sand and Gravel Bins with weighing batchers, 125 to 200 ton capacity.
Central Sand & Gravel Co.,
Memphis, Tenn.

BUSINESS OPPORTUNITIES

AGENCY WANTED

Active Sales Organization Seeks Agency
Finishing Lime, Hydrate and Barreled, for New Jersey, Metropolitan New York, Long Island.
Write Box 631, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

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H. J. BROWN CONSULTING ENGINEER

35 Deane Street, Boston, Massachusetts.
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation
Examinations
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WE LOOK INTO THE EARTH

By using Diamond Core Drills.
We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
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DIAMOND CORE DRILLING

CONTRACTORS
FIRECLAY, ASPHALT, LIMESTONE,
COAL AND ALL MINERALS
Light Gasoline Outfits
MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.

Try cloverine fertilizer all crops

H. D. RUHM

Consulting expert on phosphate matters. Correspondence solicited. Will advise as to use of and furnish all brands and grades of phosphates.

In the Mt. Pleasant Phosphate Field
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A Cooperative Engineering Service that will produce immediate returns. Our POWER ENGINEERS in cooperation with your own organization will positively reduce the costs in your plant, or effect a reduction in your purchased power rates, or there is no charge. Our 25 years of diversified experience in Power Plant Practice in the central area, is at your disposal. Highest of references from satisfied clients. POWER PLANT SERVICE CO., 20 East Jackson Blvd., Chicago, Phone Harrison 7490.

POSITIONS WANTED

HAVE YOU A JOB FOR A RELIABLE, aggressive man 40 years of age with 15 years' experience as erection and operating superintendent of sand and gravel plants, who can furnish unquestionable references for ability, integrity and conscientious application to his job? 10 years with one concern. Available now, will go anywhere. Address Box 632, care of Rock Products, 330 South Wells Street, Chicago, Ill.

CEMENT PLANT SUPT., FORMERLY connected with the International Cement Corp. in charge of their Norfolk, Va., plant. Graduate engineer with wide experience in the design, construction and operation of plants. Will consider various openings in the cement field or allied branches. Address G. F. Martinez, 627 Russ Building, San Francisco, Calif.

A SUPERINTENDENT OR PRODUCTION manager for lime or crushing plant. Broad enough to handle several plants as a general superintendent. Wages in line with the depression. Address Box 626, care of Rock Products, 330 South Wells St., Chicago, Ill.

CONSOLIDATED offers GOOD USED CRUSHING, PULVERIZING, DRYING AND FILTERING EQUIPMENT—COMPLETE

Crushing Plants; Diesel, Gasoline, Electric Cranes and Shovels; Hoists; Compressors; Pumps; Dragline and Excavating Equipment; and all sizes and types of Jaw, Gyratory and Roll Crushers; Swing Hammer Mills; Elevators; Belt Conveyors; Rotary and Vibrating Screens; Rotary Kilns and Dryers; Raymond and other fine Pulverizers; Air Separators; Hardinge Ball and Pebble Mills; Silex and Iron lined Tube Mills, etc. Send for Bulletin No. 14.

CONSOLIDATED PRODUCTS CO., Inc., 15-16-17 Park Row, New York City
Tel. Barclay 7-0600
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"The CIRCLE THROW SCREEN"

What's sauce for the goose, may be sauce for the gander—but it's different with screening material. As materials vary, so must the vibrations vary and be adjustable to meet conditions and specification requirements. The success of the SAFETY JIGGER is based on adjustable and controlled vibration—vibration that obtains highest efficiency, capacity and economy in the screening of any specific material. This naturally assures bigger profits.

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